

GWINNETT COUNTY, GEORGIA

OPEN SPACE & GREENWAY MASTER PLAN UPDATE

FINAL REPORT APRIL 2014



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A. Overview

At the turn of the 21st century, Gwinnett County initiated policies and secured funding to preserve open space resulting in the creation of an Open Space and Greenway Master Plan, which was adopted on May 21, 2002 by the Gwinnett County Board of Commissioners. The plan is a long-term vision for increasing recreational opportunities, protecting water quality, building a system of greenway trails, and reducing the environmental impact of development in Gwinnett County.

The plan comprehensively explores and covers topics including protected greenspace, open space acquisition, the development of a county greenway system, as well as an administrative, management, and funding analysis. The primary goals of the master plan were identified as follows:

1. Increase recreational opportunities
2. Protect and improve water quality
3. Increase connectivity via a system of greenway trails
4. Reduce environmental impacts of development

In 2012 Gwinnett County elected to update Section 6 of the 2002 Open Space and Greenway Master Plan, which includes trail design standards and a feasibility study of the proposed Greenway System. This document is the result of that initiative.

Three primary tasks were identified for the 2012 update:

1. Research and documentation to:
 - a. Investigate how Greenway development can fit into stream buffer, floodplain, and tree preservation ordinances to protect the environment while not prohibiting the development of new greenways.
 - b. Determine how the development approval process for subdivisions and commercial developments can incorporate greenway corridor dedication

and/or construction. Describe innovative methods and incentives used to preserve greenspace and greenway corridors.

- c. Describe the potential role of the Gwinnett County open space and greenways program as it relates to wetland and stream bank restoration projects in coordination with Gwinnett DWR and DOT projects.
2. Greenway Trail Feasibility and System Map update
 - a. Assess the original 2002 Master Plan and 2007 Update of the Gwinnett County Parks and Recreation Capital Improvement Plan in order to develop a more targeted System Map and to identify new opportunities or constraints that may have arisen since previous plans. This analysis should result in a prioritization schedule for future Greenway development.
3. Design Guidelines
 - a. Develop design guidelines for the Greenway System that will apply to both public and private entities. These guidelines should include procedures for dedicating Greenway easements, design standards for the greenway trails, and standards for a wayfinding system for county built trails.

Upon completion of the above-mentioned tasks, this report was developed along with a draft resolution to amend the Gwinnett County development regulations with regard to Greenway implementation. This master plan update for the Gwinnett County Greenway System greatly simplifies the proposed network into a feasible, prioritized, and attainable system of greenways for implementation by both the County and private developers that will continue to support the four primary goals established in the 2002 master plan.



This report primarily replaces Section 6 of the 2002 Master Plan; however, much of the rest of the 2002 Master Plan remains as either historic documentation or valid background information that led to the achievements of the past ten years and exists as the basis for this selective update. Additionally, all definitions in the 2002 Master Plan apply to the language in this update.

B. Developing Greenways in Gwinnett County

The concept of developing a greenway system in Gwinnett County is not a new idea. As early as 1988, the Gwinnett County Department of Human Services commissioned a master plan for a trail system. The plan, known as the Gwinnett County Trail System, was developed by Robinson Fisher Associates, Inc. The plan's executive summary discusses the potential for developing over 200 miles of trails via existing utility corridors, gas pipelines, water and sewer easements, and natural corridors. The proposed system would have provided a trail within five miles by road of all homes, schools, workplaces and shopping areas in the County, as well as direct access to all major parks, activity centers and natural areas.

Past Planning Studies Developed by the County

In 1995, the Gwinnett County Department of Planning and Development drafted a report entitled Pedestrian, Bicycle and Greenways Plan for Gwinnett County, Third Draft. The goal of the plan was "to contribute to the overall quality of life and economic well being of Gwinnett County by developing and improving opportunities for walking and cycling." The plan recommends a "multifaceted" or comprehensive approach to developing an interconnected system of walkways, bikeways and greenways. Based on citizen input and research, the 1995 plan concluded that:

- Walking and bicycling play a significant role in an intermodal transportation system by reducing traffic congestion, connecting to transit park and ride lots, and improving air quality.
- Walking and bicycling can replace a short trip that would usually be made by automobile.
- Improving opportunities for walking and bicycling throughout the County reaps multiple "quality-of-life" benefits including health, economic, increases in tourism and environmental.

- Improving opportunities for walking and bicycling can help give Gwinnett County a competitive edge over other metropolitan areas in attracting and maintaining businesses.
- Walking is the most popular recreational activity of Gwinnett residents.
- Greenways are one of the most desired recreational facilities; bicycle trails rank second.
- Gwinnett citizens want to walk and bicycle from home.
- Gwinnett County sidewalk policies and regulations need to be improved to satisfy ADA regulations and be comparable to many other cities and neighboring counties.
- Bicycle lanes should be considered as part of road improvement projects. The construction cost of adding bicycle lanes to road projects is estimated at 5 to 8% of total project cost and significantly benefits motorists by providing room for disabled vehicles, service and delivery vehicles.

The 2002 plan, as shown in the Figure B.1, proposed a 1,900-mile network of greenways, bike routes, on-road and off-road trails. The master planning process was guided by a staff committee and a citizen steering committee. The staff committee was composed of representatives of various Gwinnett County departments, while the steering committee included representatives of the public from around the County. Public input was also solicited in thirteen public meetings and four focus group meetings with special interest groups. Representatives of Gwinnett County municipalities also provided comments and recommendations at one of the special interest group meetings.

Goals of the 2002 master plan:

Primary Goals

- Increase recreation opportunities



- Protect and improve water quality
- Increase connectivity via a system of greenway trails
- Reduce environmental impacts of development

Secondary Goals

- Enhance aesthetics throughout the County
- Protect plant and animal habitat
- Promote biodiversity
- Enhance air quality
- Improve transportation opportunities
- Mitigate traffic congestion
- Realize economic benefits of open space and greenways
- Enhance tourism opportunities
- Promote good health
- Protect historic and archeological resources
- Protect cultural resources

Completed Projects

- Ivy Creek Greenway at George Pierce Park
- Ivy Creek Greenway (Environmental & Heritage Center to Gravel Springs Road)
- Camp Creek Greenway Lions Club Park Connection

Greenway System Development

Regarding the development of a greenway system, the 2002 Open Space and Greenway Master Plan established the following:

Two elements critical to the success of building a greenway system include public education and coordination and cooperation among all the County agencies. To build support, the benefits of greenways for transportation, water quality, plant and animal habitat, open space and recreation must be demonstrated to the public. A key selling

point is the positive effect that greenways have on neighboring property values. It may also be necessary to dispel other myths that public trails will increase crime and bring undesirable elements into one's neighborhood.

A multi-agency approach to development will be required. The Department of Transportation has already included comprehensive system components for bicycle and sidewalk elements into its current Comprehensive Transportation Plan and has identified several off road multi-use paths. The engineering and implementation of these routes should be coordinated with the additional routes proposed in this master plan.

Greenway and open space development falls under the jurisdiction of the Project Administration Division of Gwinnett County Parks and Recreation. Within the division, the Greenspace Planner coordinates with other parks staff, sections, county departments, and citizen groups for the development and implementation of the greenway system.

Greenway Funding

Greenway development design and construction costs can vary widely depending on the terrain, number of road and stream crossings, the nature of the land where the trail will be constructed, and the type of trail surface to be constructed. Costs can average \$1 million per mile for paved multi-use trails with boardwalk and/or bridges. The 2002 Master Plan indicated that a minimum initial investment of \$30 million was to be spent constructing multi-use off-road trails, or greenways, over a ten year period. Additional funds were to be appropriated for operations and maintenance of the new greenways and open space.

Looking forward ten years, the Gwinnett County goal for land acquisition, design, and implementation of new greenways shall be approximately \$25 million. The value includes remaining funding from the current Special

Purpose Local Option Sales Tax (SPLOST) that went into effect April 2009 and expires March 2014, but can also be augmented by outside grant funding such as Transportation Enhancement (TE), the Congestion Mitigation & Air Quality Improvement Program (CMAQ), Safe Routes to School, Recreational Trails Grants from the Georgia Department of Natural Resources (DNR), or other funding sources to which Gwinnett could provide matching funds. Actual County funding will depend upon approval of future SPLOST and allocations thereof.

- Assign a staff member within Parks and Recreation as the Open Space Coordinator – Accomplished by creating the Greenway Planner position
- Expand the role of the Parks and Recreation Authority to oversee open space and greenway projects – No subcommittee has yet been formed, but the authority has played an active role in greenway project prioritization
- Increase funding for implementation and operation of an Open Space and Greenway System (ongoing)

Status of Development Action Items Identified in the 2002 Open Space and Greenway Master Plan

- Educate the public on community benefits – Accomplished by promoting greenways at National Get Outdoors events, meeting with neighborhood HOAs, holding grand opening ceremonies for greenway construction projects, and publishing the Open Space and Greenway Master Plan on the Gwinnett County web site
- Update comprehensive plans, regulations and ordinances to reflect greenway development needs throughout the County – Accomplished by modifying zoning regulations to include mandatory greenway connections in the Mall of Georgia overlay district, encouraging recreation and pedestrian connectivity with a conservation subdivision overlay district, and incorporating greenway development into the 2030 Comprehensive Plan
- Coordinate the engineering and implementation plans for the system (ongoing)
- Appoint the Department of Community Services, Division of Parks and Recreation as the lead agency on greenways and open space

GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure B.1: 2002 Greenways Master Plan



Approximately 1900 miles of on- and off-road trails were shown in the original Greenways and Open Space Master Plan

LEGEND

County Open Space	Greenways Layer 1
Floodplains	Greenways Layer 2
Wetlands	Greenways Layer 3
Commercial Land Use	Bike Greenways
Schools and Libraries	On-Road Trail
County Boundary	Off-Road Trail
Major Roads	
Interstate	

Data Sources: Gwinnett County.



Scale: 1 inch = 3 miles





C. Greenway Feasibility Study

Reason for Feasibility Study

Eleven years have passed since the Gwinnett County Greenway Plan was launched with the completion of the 2002 Gwinnett Open Space and Greenway Master Plan. Since the plan was adopted, development and growth in the County may have created new opportunities for greenway connections or altered the course of proposed greenways. At the time of this writing, Gwinnett County was in the process of updating its Unified Development Ordinance, wherein new regulations concerning greenway development were being considered. The Department of Community Services needs to set the course for greenway planning and construction over the next ten years by revisiting the large network of greenways proposed in the master plan, evaluating greenway feasibility based on current conditions, and adopting a new greenway plan map that identifies corridors with the highest feasibility.

The 2002 Open Space and Greenway Master Plan identifies almost 1900 miles of trails and bicycle routes. Because it is not feasible for the county to undertake a project of this size, it is necessary to identify those areas of the proposed system that are most conducive for near-term construction based on current need and ground conditions. It is important to state here that this study is a refinement of the original 1900 mile network and does not preclude any of the originally-identified trail segments from being constructed. The results of this study are three-fold.

1. The 1,900 mile greenway network described in the 2002 Open Space and Greenway Master Plan will be reduced to a clearer, more manageable scope and size for near-term construction.
2. All proposed greenways will be ranked as either Tier I or Tier II for incorporation into the Unified Development Ordinance.
3. The list of priority greenways will be updated and described.

Methodology

The analysis began by visually examining the original greenway data from the 2002 Open Space and Greenway Master Plan. These data were delivered to the consultant team in three separate shapefile datasets, outlined below, along with data on parcels, buildings, land use, water, wetlands, roads, and other data.

1. *Greenways.shp* was a polyline dataset provided and created by the Greenspace Planner to show proposed greenway alignments.
2. *Bike_path_greenway.shp* file was a polyline dataset provided by the Greenspace Planner, and created by Gwinnett County to show various utility easements and floodplains within the county.
3. *Proposed_routes_on_off_road.shp* file was a polyline dataset provided by the Greenspace Planner that used USGS stream centerline data as well as road data to show a network of planned transportation enhancement facilities using these two corridor types.

These three data sets showed a combined network of almost 1,900 miles of trails (Figure C.1). Upon closer examination of the data, it was found that these three datasets presented conflicting and redundant information in many cases. Polylines in all three datasets overlapped one another, ran directly parallel to each other with less than 100' of lateral distance between them, or ran through physical obstacles such as large existing buildings or bodies of water. The consultant team began by cleaning the datasets to eliminate all redundancies and physical conflicts. Additionally, all on-road facilities were eliminated from our analysis, so as to only focus on greenways rather than on-street bikeways.

Once cleaned, the data were then combined into a unified dataset that incorporated approximately 546 miles of proposed off-road greenways from all three datasets (Figure C.2, page 9).

These cleaned-and-combined data then went through another round of analysis to determine feasibility and aid in prioritizing specific trails for incorporation into the Unified Development Ordinance.

The second stage of analysis further clarified trail feasibility by running computer-based analyses

on the combined proposed trail system using ArcMap, a commonly used GIS display and analysis program. This second analysis examined the combined greenway network in relation to existing buildings and railroads. This analysis was based on two assumptions: 1) that greenway development would be much less feasible within

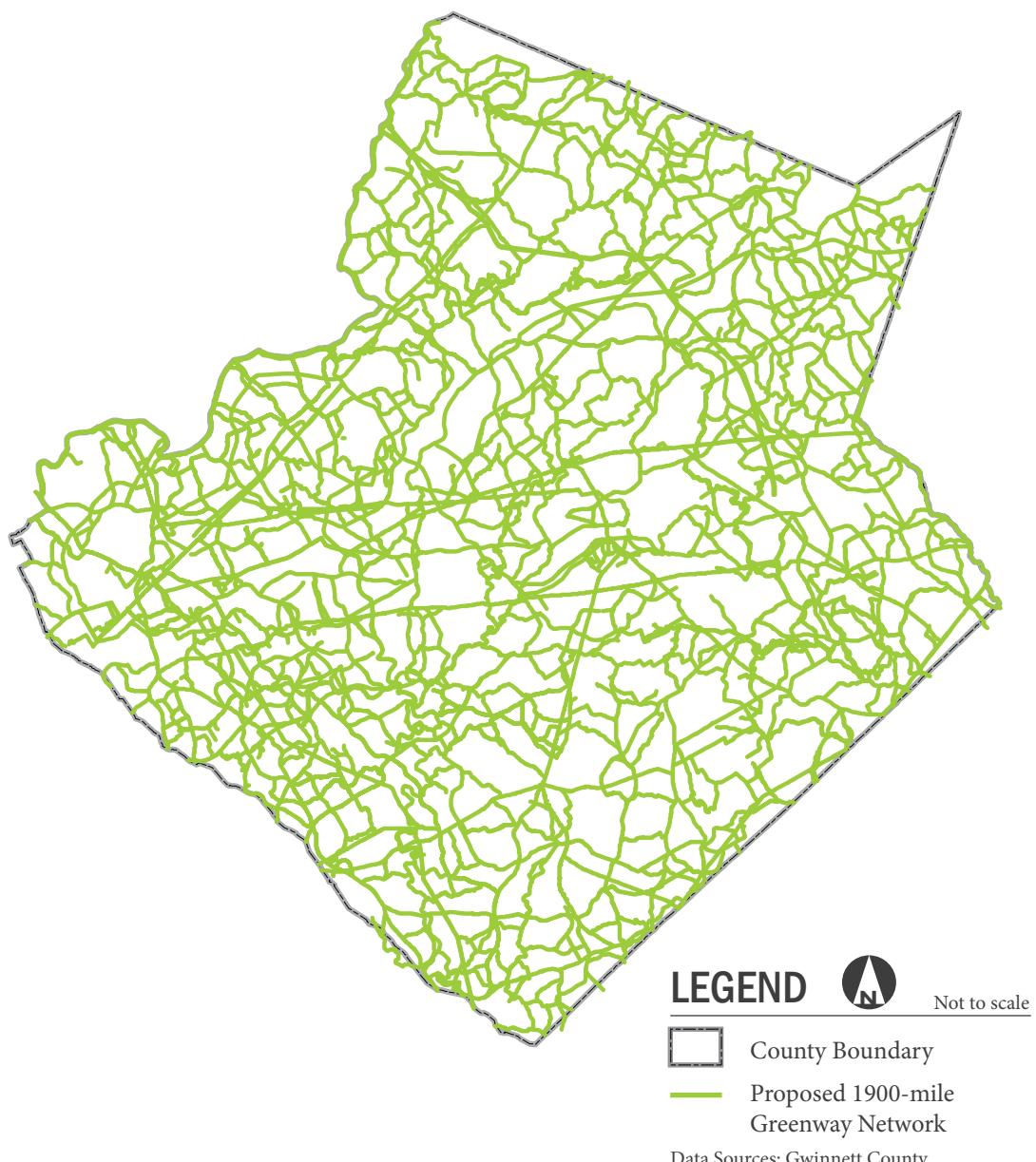


Figure C.1: Simplified view of original 1900-mile greenway network, as proposed in the 2002 Open Space and Greenway Master Plan

200 feet of an existing building footprint and 2) greenway development would be much less feasible within 100 feet of an active railroad right-of-way. In ArcMap, a 200 foot buffer was applied to building footprint data supplied by Gwinnett County, and a 100 foot buffer was applied to active railroads running through the county.

Those parts of the combined greenway network that intersected either the railroad or existing building offsets were highlighted using ArcMap display settings.

Of the 546 miles of proposed greenway, 134 miles, or 24.5% of the total length, fell within

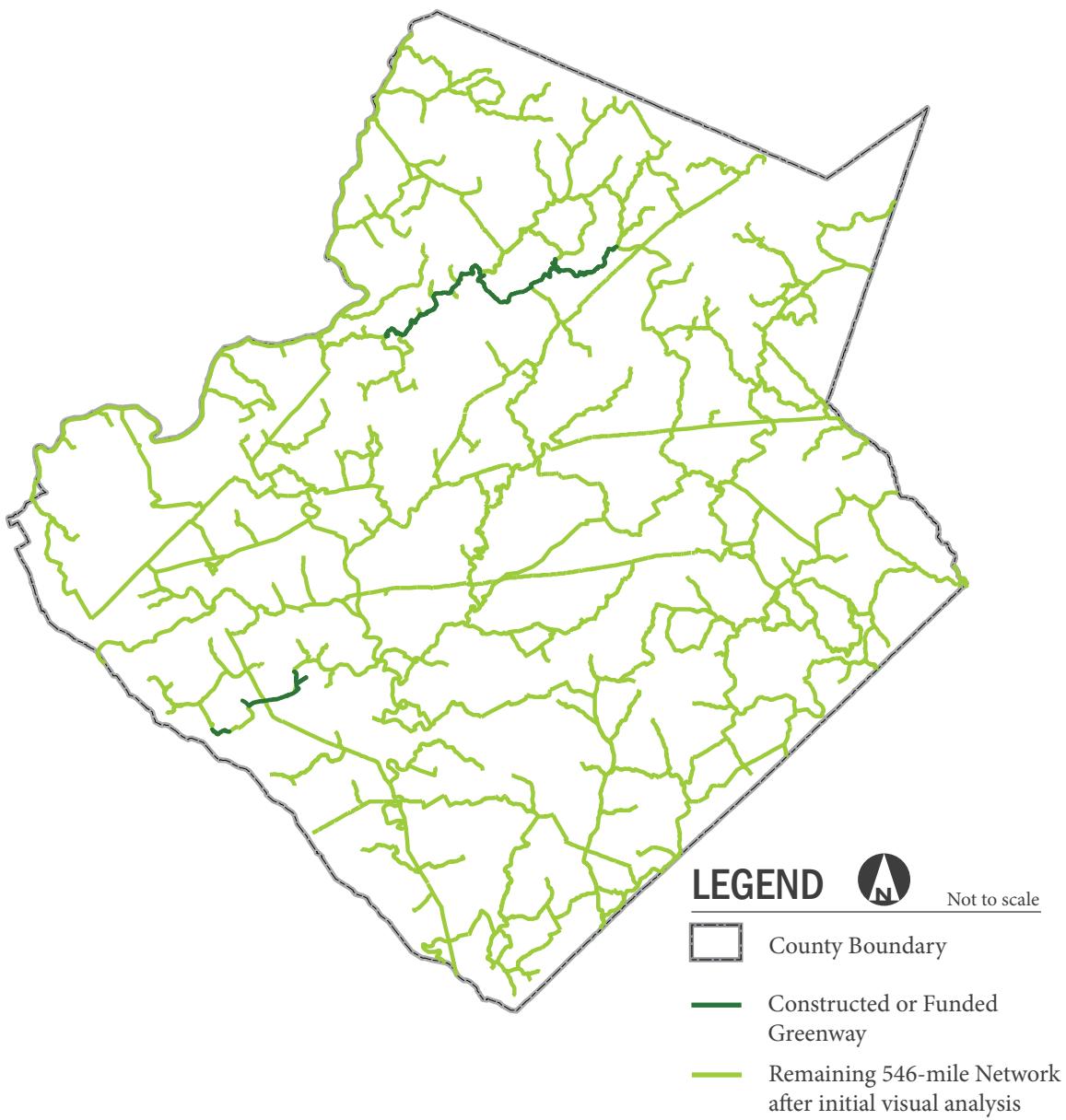


Figure C.2: Illustration of trail segments that were retained after preliminary visual analysis of 1900-mile greenway network

these buffers. These trail segments were deemed to be extremely unlikely to be built within the next several years, and so were largely removed from further consideration. However, some of these less-feasible trail segments were retained for further analysis due to being part of a Primary

trail, as defined in Section 6G of the 2002 Master Plan, or because of the trail's perceived importance to the entire network. The result of this analysis was that large segments of less feasible trail were removed from consideration, bringing more focus to those segments of

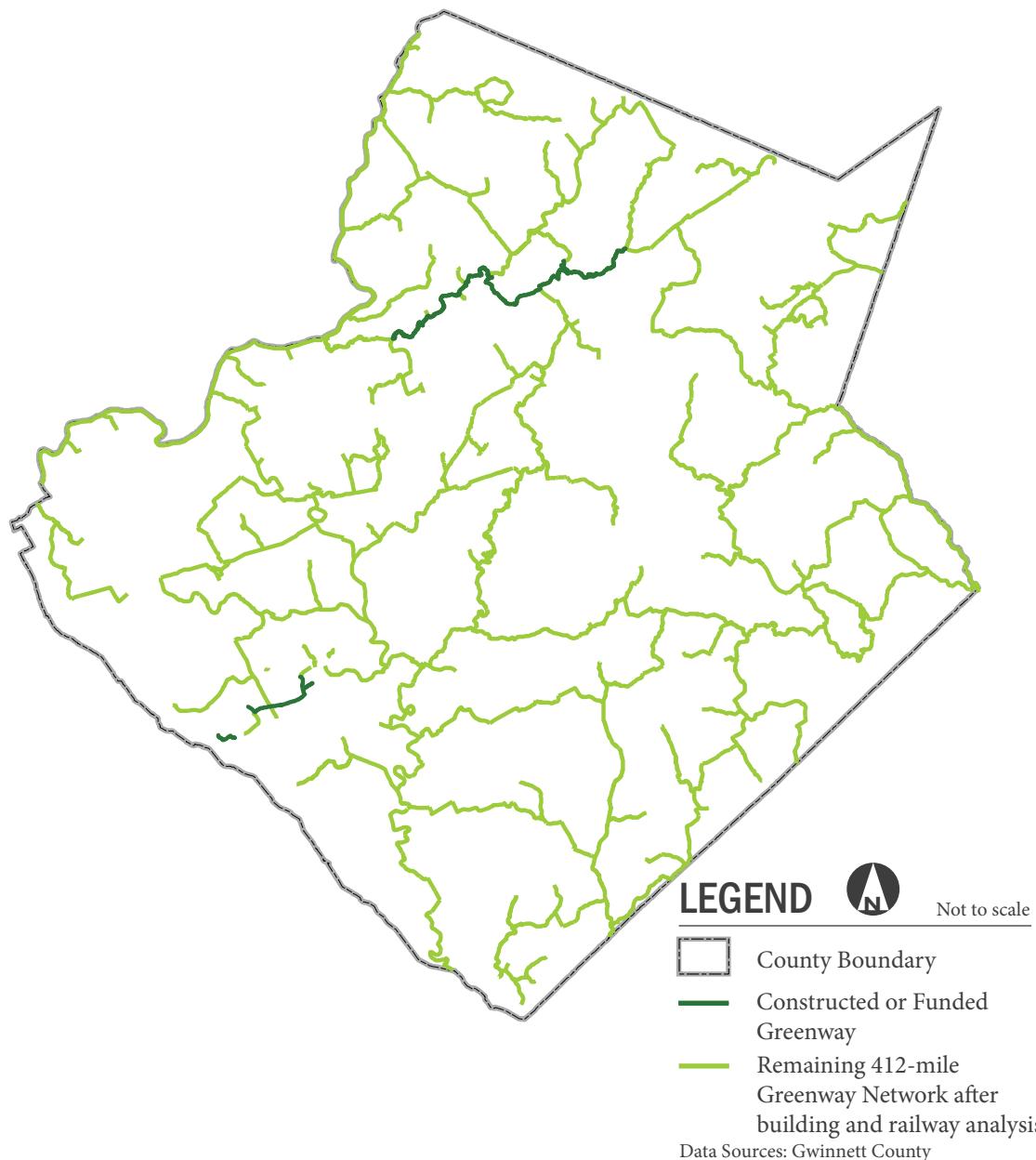


Figure C.3: Illustration of trail segments that were retained after offset analysis of existing buildings and railroads



the network that do not encroach on existing development and which do not conflict with active railroad lines (Figure C.3, page 10). Once the 546 mile dataset was cleaned of less-feasible trail, the total length of the greenway network shrank again to approximately 412 miles.

The third stage of analysis used a weighted overlay analysis in ArcMap to concurrently examine several factors contributing to feasibility. This analysis takes a more positive approach to determining feasibility by looking at land use types that are desirable to connect to the system. Trail segments that serve to connect desirable land use types get a higher score than those that do not and thus have a higher feasibility. The factors used in the analysis can be seen in Table C.1, and were agreed upon in consultation with Gwinnett Parks and Recreation. They are as follows:

- 1) Trail proximity to libraries, schools, and county-owned land
- 2) Trail proximity to commercial land use
- 3) Trail proximity to wetlands and bodies of water
- 4) Trail proximity to parks and greenspace
- 5) Trail proximity to residential land use
- 6) Slope of the land that the trails traverse
- 7) Trail type

Once priorities were assigned to each of the above factors, a modeling tool was programmed using the Spatial Analyst extension in ArcMap. This modeling tool weighed all of the above factors using their assigned importance level to arrive at a spectrum of feasibility for all of the trails in the 412 mile network. The results of this weighted overlay study are divided into five different tiers of feasibility, from High feasibility to Low feasibility based on the score of each trail segment (Figure C.4).

In areas that are already developed, proposed greenways wind through corridors of land that were not developable due to terrain, buffers, wetlands, and other constraints. Land use and ownership also affect feasibility. Trails will often

Table C.1: Factors used in weighted overlay analysis. A ranking of 5 indicates the most important features to connect or protect. A ranking of 1 indicates the least important features to connect or protect

Connectivity of Greenways to:	Rank
Parks	5
Cemeteries	2
Schools	4
Post Office	1
Fire Stations	1
Church	2
Libraries	4
Police Stations	1
Streams	4
Wetlands	4
Water Bodies	3
Stream Buffers	4
Wetland Buffers	4
Transit Stops	3
Undeveloped County Owned Parcels	3
County Owned Parcels	2
Residential Proximity	5
Primary Greenway Corridors	5

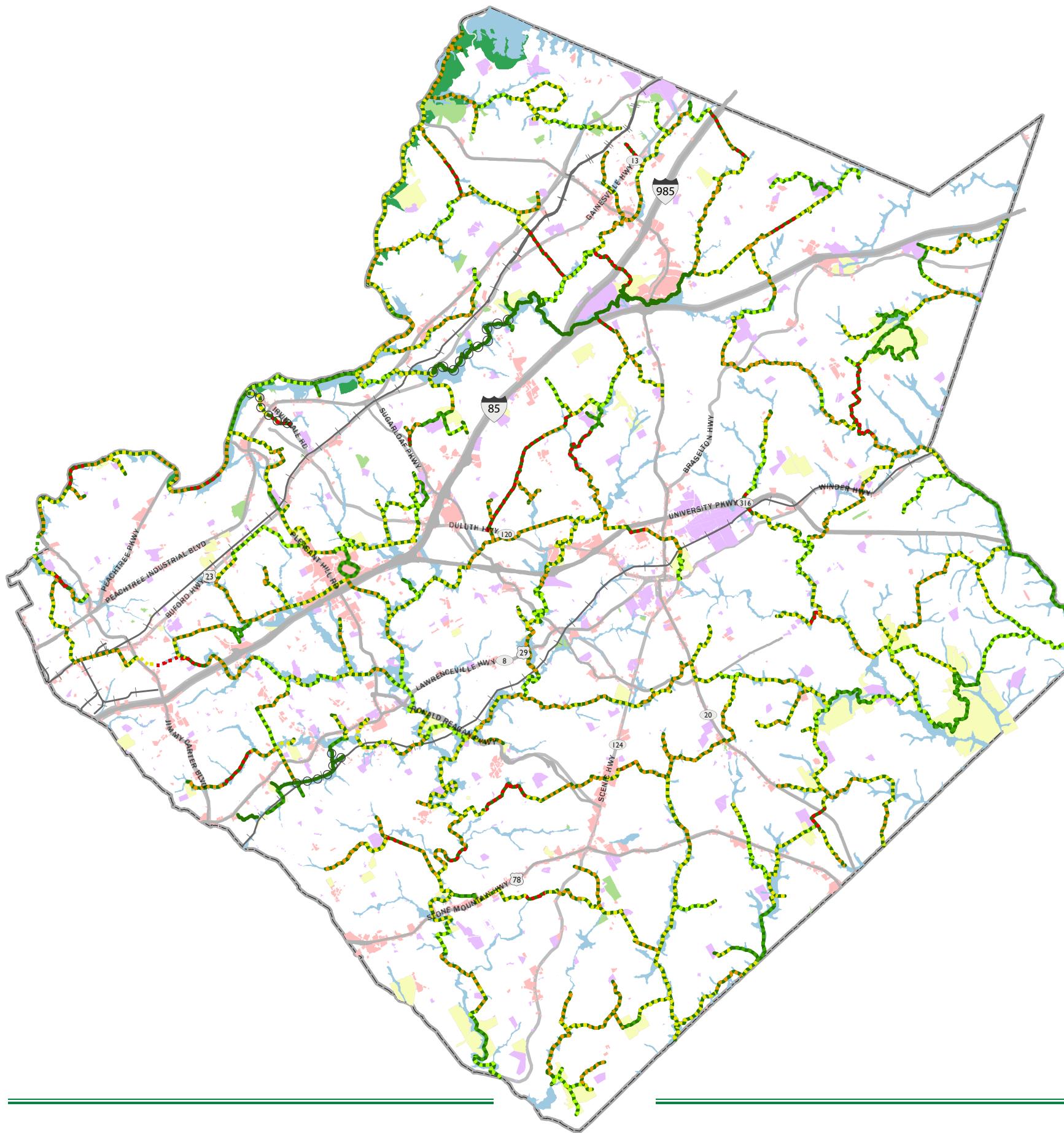
Protection of:	Rank
Streams	5
Wetlands	5
Water Bodies	4
Stream Buffers	4
Wetland Buffers	4
Parks	5
Cemeteries	3
Schools	3
Libraries	3
Primary Greenway Corridors	5
Residential Proximity	3
Undeveloped County Owned Parcels	3

need right of entry to privately-held lands to make important connections or continuations of the network. The most feasible trails have the fewest land restrictions and the most promise for connecting desired destinations; while less feasible trails have a range of constraints to overcome prior to implementation.

While the output from the computerized process was important in building the feasibility model for the greenway network, it was recognized that some trails shown as having low feasibility still may be important to the connectivity of the entire system. Another round of analysis was initiated by submitting the combined 412-mile greenway dataset with feasibility analysis to Gwinnett County Parks and Recreation staff to identify roadside facilities critical to the connectivity of the entire system. Additionally, the feasibility spectrum was simplified from the five-tier feasibility output to just two levels: Tier I and Tier II. These tiers, and what they mean, are discussed in more depth in the next chapter.

The final 386-mile dataset is considered to be the final iteration of this update, and is the only dataset that is discussed from this point forward in the report. The simplified greenway network represented in this dataset is not exclusive, but rather serves as a template for what may be realistically achieved.

Roadside facilities are included only as tools to assist the Gwinnett Department of Transportation prioritize roadside facilities in future road projects. The roadside facilities shown in this plan are not meant to represent a complete plan for the county. They are meant only to illustrate roadside paths that are necessary to make connections between greenway systems, or serve as alternates to greenways where there is no feasible off-road facility.

GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure C.4: Greenway Feasibility Analysis

LEGEND

Greenway Feasibility	
High Feasibility	40 mi (10%)
Medium-High Feasibility	63 mi (15%)
Medium Feasibility	137 mi (33%)
Medium-Low Feasibility	110 mi (27%)
Low Feasibility	27 mi (7%)
Funded or Constructed Greenway	35 mi (8%)
○○○○ Greenway Owned by Other Jurisdiction	
County Park Property	
City Park Property	
Federal Park Property	
Floodplains	
Commercial Land Use	
Schools and Libraries	
County Boundary	
Major Roads	
Other Roads	
Railroads	

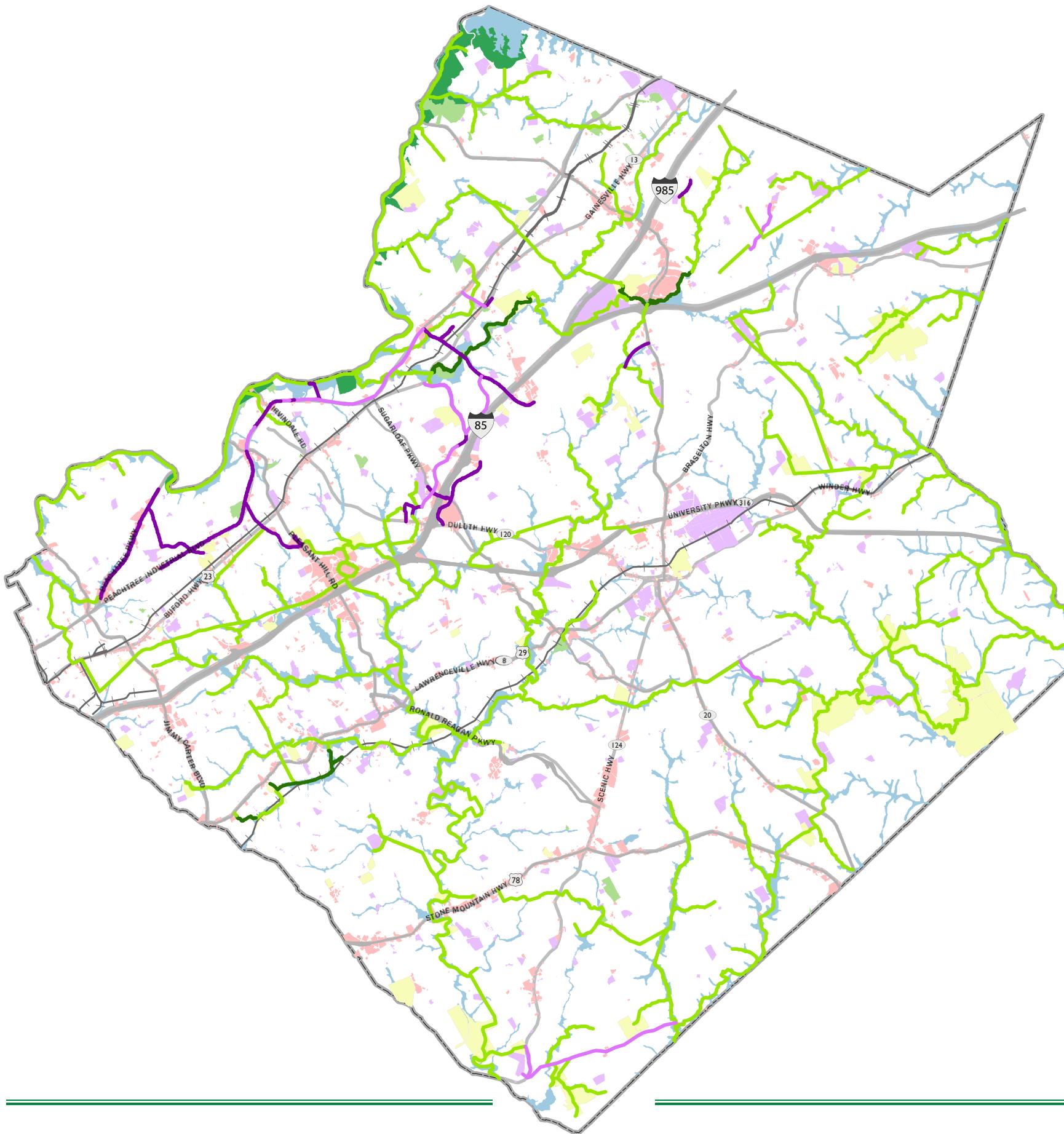
Scale: 1 inch = 3 miles



Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County.

GREENWAYS & OPEN SPACE MASTER PLAN UPDATE

Figure C.5: Final Greenway Masterplan



LEGEND

- Greenway that has been Constructed (11 mi)
- Proposed Greenway (331 mi)
- Roadside Trail* that has been Constructed (24 mi)
- Proposed Roadside Trail* (20 mi)
- County Park Property
- City Park Property
- Federal Park Property
- Floodplains
- Commercial Land Use
- Schools and Libraries
- County Boundary
- Major Roads
- Other Roads
- Railroads

* Roadside trails generally fall under the jurisdiction of the Gwinnett County Department of Transportation. The roadside trails shown in this map are not intended to represent a complete plan for the county. It shows only those roadside trails that are necessary to make connections between greenways, or serve as alternates to greenways where no off-road option is feasible.

A horizontal scale bar with tick marks at 0, 1.5, 3, 6, and 9 miles. The bar is black with white tick marks and labels.

Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County.





D. Master Plan Update

As discussed in the Design Standards Section of the 2002 Open Space and Greenway Master Plan, a greenway system is made up of standard elements that are interconnected to create a separate transportation and recreation system for both short and long trips. This master plan update moves away from the 2002 plan description of on-road and off-road systems to focus mostly on off-road greenways. Some roadside connections are shown to complete connectivity, but the focus of this update is dedicated off-road greenways.

With the creation of this update, the idea of on-versus off-road systems has been replaced with a simplified greenway system. Because identifying and developing almost 1,900 miles of trails and bike routes is not feasible for Gwinnett County to undertake, it is necessary for this update to narrow the focus to that which can actually be accomplished. For comparison, the PATH Foundation has been very successful in developing trails throughout the entire state of Georgia and has been able to implement about 180 miles of trail in twenty-two years.

The greenway system described in this update is predominately composed of off-road trails, or those trails that are built as separate, dedicated, multi-use, non-motorized travel routes. These trails may be located within existing road rights-of-way, fee-simple acquisitions, or independently dedicated rights-of-way and/or easements. Most roadside trail considerations have been eliminated from this update. However, it should be noted that less-feasible trail corridors may require the use of roadside connections to maintain system connectivity.

Right-of-Way Requirements for Greenway Trails

Based on greenway best practices, it is recommended that the minimum width of greenway rights-of-way be 75'. Within a 75' width, a vegetative buffer can be maintained along the trails. These buffers will provide a green

corridor to be enjoyed by trail users and provide cover for wildlife to move within the corridor.

When multiple trails will be developed in the corridor, such as a 12' paved trail and a natural surface equestrian trail, it is recommended rights-of-way be increased to a minimum of 100'. This will allow for separation between the two trails for improved safety and enjoyment for all users. Equestrian trails should not be combined with any type of bicycle trail for safety. Pedestrian activity on equestrian trails is not desirable, but is a common use of equestrian trails.

The placement of the right-of-way is another important factor that must be considered. The development of a greenway system as part of a larger open space system provides opportunities for a variety of trail placements within the larger open space system. The trails can be built within stream buffers required for water quality protection, within floodplains, or outside the floodplains but still within river corridors. To minimize impact on water quality, trails should be set back at least the state-mandated 25' buffer distance from streams. Ideally, trails can be located along the larger streams that have wide floodplains and along smaller streams that have limited development at this time. In areas where there are smaller floodplains and more development has occurred, the trails will most likely have to be closer to the streams and within the floodplain and, in some cases, within the stream buffers.

Best management practices should be applied in greenway construction to mitigate stormwater runoff, including the use of pervious pavement when possible. In all cases, if the County does not own the property in fee simple, acquisition, dedication, or an easement will be required to construct the trail.

On sections of the greenway that run overland via utility corridors, a smaller right-of way can be acquired. For example, if a trail is to be built in a utility corridor that has a 100' easement,

the trail right-of-way could be reduced to 25'. This would provide adequate area to construct the trail. When the County has to purchase the right-of-way for the trail, the reduced width would also reduce the overall cost. As trees and other large landscape materials are not desired within these utility easements, a vegetative buffer will not be possible. The potential for undesirable encroachments is much lower within the utility easements as the utility company typically limits development within their easements. If the rights-of-way granted within the utility easements are at low or no cost to the County, the County should consider acquiring larger right-of-way if they feel the potential for parking lots or other undesirable facilities are likely to encroach upon the trails.

In all greenway projects there are areas where natural features or existing facilities limit the area in which a trail can be constructed. In these locations the rights-of-way often are reduced and fall just outside the trail safety zone. This is also true where boardwalks are constructed as part of the trail to cross large wetland systems. Because there is a very low potential for development adjacent to the boardwalk the County would not have to buy a large right-of-way to buffer the trail. However, acquisition of wetlands for interpretive use and protection of wetland systems is desirable.

Routing Plan

Determining where greenway trails should be located is based on where connections should be made, where suitable land exists, and where minimal impact will be made on potential for future development. In developing the routing plan the following design principles were applied:

- Prioritize connections to parks, schools, public facilities and residential areas.
- Connect routes through undeveloped property or property not suitable for typical development due to floodplains, terrain, etc. whenever possible.
- Follow natural corridors, such as river and streams, to take advantage of floodplains that

have less development.

- When required, use road-based systems to make connections between off-road trails to complete looping opportunities or to link to high priority facilities.
- When necessary, utilize existing utility corridors for overland connections.
- Anticipate the impact of trail construction on undeveloped properties and locate trail to minimize impacts on future development.
- Review existing planning documents and previously proposed trail and bicycle routes, and look at possible overlap and connection potential.

The routing plan as proposed will provide connections to major parks in the County and many schools. Many of the proposed routes can be constructed with minimal impact on existing residential development but some connections are required through existing subdivisions.

Property Acquisition and Agency Coordination

Property and right-of-way acquisition will be a key component of any trail development program and should be continuously pursued. In projects that use federal funding, special considerations apply. Once a project with federal funding initiates, acquisition cannot begin until the right-of-way phase begins.

As trail construction progresses, coordination between several government agencies will be critical to ensure compliance with regulations and to ease the process of trail construction and maintenance. Some key agencies are listed below, but this list is not comprehensive.

- 1) United States Army Corps of Engineers
- 2) United States Department of Transportation
- 3) United States Department of the Interior (Chattahoochee River National Recreation Area)
- 4) Federal Emergency Management Agency



- 5) Georgia Environmental Protection Division
- 6) Georgia Department of Transportation
- 7) Gwinnett County Department of Transportation
- 8) Gwinnett County Department of Planning and Development
- 9) Gwinnett County Department of Community Services
- 10) Gwinnett County Public Schools
- 11) Gwinnett County Support Services
- 12) Gwinnett Chamber of Commerce
- 13) City Parks and Recreation Departments
- 14) City Community Development Departments

Because many of the recommended trails are placed near streams and rivers, protection of water resources becomes especially important. Stream crossings, both temporary and permanent, must be coordinated with the United States Army Corps of Engineers (USACE), the Georgia Environmental Protection Division (EPD), the Federal Emergency Management Agency (FEMA), and local regulators as applicable. All wetland encroachments must be coordinated with the USACE. Stream buffer variances, both state and local, may be required to allow the construction of greenway trails.

considered a replacement for real cost estimates based on real projects and site conditions, developed by a qualified engineer or landscape architect. Actual costs will vary greatly depending on any number of factors. Less complicated trails without the need for right-of-way can be priced well below the sample shown. As a general rule, one mile of greenway costs approximately \$1 million, but at 2013 prices, one mile of trail can range from \$700,000 to \$1.2 million depending on complexity and funding sources.

Cost Estimate

Costs will vary from trail segment to trail segment depending on the real conditions of the site, the material used to construct the trail, property acquisition costs, stream crossings, road crossings, and any number of other factors. However, a typical per-mile cost estimate is included here as an example of the costs the county may expect to encounter. This cost estimate should not be

Table D.1: Sample Cost of One Mile Concrete Trail including 1/4 mile of Boardwalk and One Stream Crossing

Erosion Control	Quantity	Unit	Unit Price	Cost
Silt Fence - Type C	10,560.00	LF	\$3.94	\$41,606.40
Maintenance of Silt Fence	5,280.00	LF	\$0.99	\$5,227.20
Tree Protection Fence	5,500.00	LF	\$2.69	\$14,795.00
Permanent Grass	3.00	AC	\$13,750.00	\$41,250.00
Temporary Grass	3.00	AC	\$3,875.00	\$11,625.00
Construction Exits	2.00	EA	\$2,250.00	\$4,500.00
Water Quality Monitoring and Sampling	11.00	MO	\$312.50	\$3,437.50
Subtotal				\$122,441.10
Earthwork	Quantity	Unit	Unit Price	Cost
Grading Complete	1.00	LS	\$125,000.00	\$125,000.00
Subtotal				\$125,000.00
Hardscape	Quantity	Unit	Unit Price	Cost
Multi-Use Trail (5" thick concrete)	4,387.50	SY	\$60.13	\$263,820.38
Curb ramps with truncated domes	4.00	EA	\$500.00	\$2,000.00
Sawcut joints	3,960.00	LF	\$1.75	\$6,930.00
Boardwalk	1,320.00	LF	\$437.50	\$577,500.00
Subtotal				\$850,250.38
Site Structures	Quantity	Unit	Unit Price	Cost
Stream Crossing	1.00	LS	\$100,000.00	\$100,000.00
Subtotal				\$100,000.00
Site Furnishings	Quantity	Unit	Unit Price	Cost
Bollard	9.00	EA	\$1,000.00	\$9,000.00
Benches	2.00	EA	\$1,875.00	\$3,750.00
Trash Receptacles	2.00	EA	\$937.50	\$1,875.00
Paint Traffic Stripe, 5", Yellow	5,280.00	GLF	\$0.33	\$1,742.40
Signs	10.00	EA	\$250.00	\$2,500.00
Trailhead Kiosk	1.00	EA	\$18,500.00	\$18,500.00
Subtotal				\$37,367.40
Landscaping	Quantity	Unit	Unit Price	Cost
Landscaping	1.00	LS	\$20,000.00	\$20,000.00
Subtotal				\$20,000.00
Right of Way (ROW)*	Quantity	Unit	Unit Price	Cost
	3	AC	\$18,750.00	\$56,250.00
Subtotal				\$56,250.00
Subtotal Construction Cost				\$1,311,308.88
Planning and Engineering				\$166,412.00
CEI/Materials Testing (2.5%)				\$32,782.72
Subtotal with O&P, CEI, and Planning/Engineering				\$1,510,503.60
Contingency (10 %)				\$131,130.89
Grand Total Project Cost				\$1,641,634.48

* A 25' wide corridor of ROW acquisition over one mile of distance is equal to just over 3 acres of land. For this generic cost exercise, it was assumed that 100% of this total would need to be acquired.



Tier I and Tier II

Proposed greenways in this update are classified in two categories: Tier I and Tier II. These are classifications that may require action to be taken by new development that falls along these routes in compliance with the Unified Development Ordinance.

Tier I Greenways are greenways that will require developers to assign easements for greenway construction and/or to construct the greenway itself within a development or redevelopment project, if it lies along the greenway corridor as shown in this document, in compliance with the Unified Development Ordinance.

Tier II Greenways are corridors that are desired, but for which new developments will *not* be required to assign easements nor construct the greenway, according to the Unified Development Ordinance.

Roadside paths that have been classified as Tier I will require developers to coordinate roadside trail construction with the Gwinnett County Department of Transportation, in compliance with the Unified Development Ordinance.

Because the scale of the county-wide system is so large, parcel-level data pertinent to specific developments are not shown in this report. The maps contained in this report are intended to show conceptual alignments of proposed and existing greenways relative to major roads, railroads, open space, riparian corridors, municipalities, commercial, and institutional development. Actual location of greenway corridors will be determined by environmental factors and by connections to existing or planned greenways on adjacent properties. All greenway locations will need to be approved by the Department of Community Services. It will be the responsibility of developers to request the

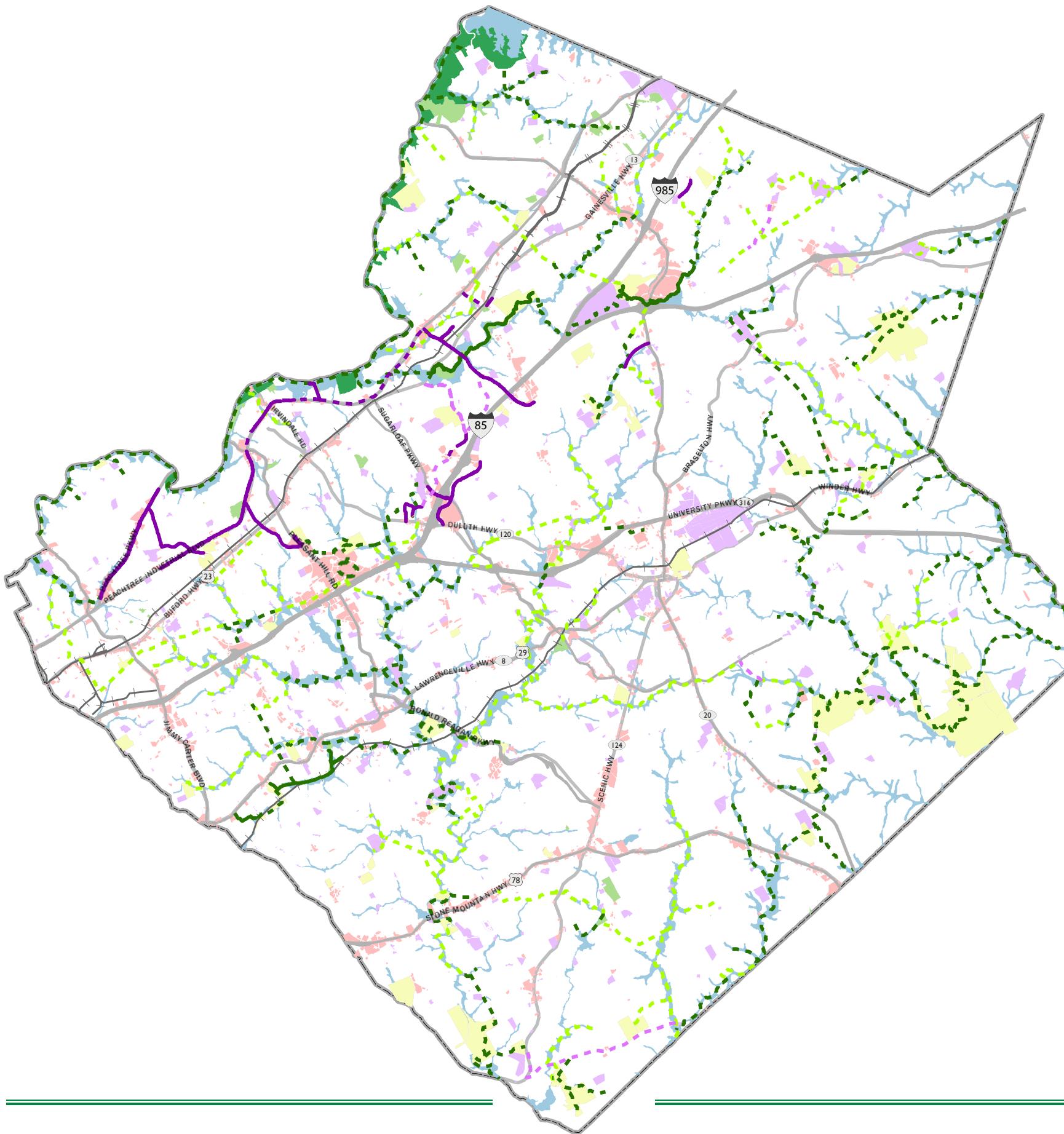
greenway locations from Gwinnett County to see if any Tier I or Tier II greenways pass through a proposed development.

Priority Greenways

Priority greenways are greenways that are prioritized for construction. These trail segments have either already been funded, or have been identified in the 2013 Gwinnett County Parks and Recreation Capital Improvements Plan Update as recommended projects. These trail segments replace the Pilot Greenway Projects identified in Section 6H of the 2002 Open Space and Greenway Master Plan. They are discussed in more detail in the following chapter.

A map of the county-wide proposed greenway system, trail classification (Tier I or Tier II and Priority), and detailed maps of each of the quadrants of the county follow in Figures D.1-D.6.

Figure D.1: Greenway Master Plan with
Tier I and Tier II Indications



LEGEND

— Greenway that has been Constructed (11 mi)	County Park Property
- - - Tier I Proposed Greenway (198 mi)	City Park Property
- - - Tier II Proposed Greenway (134 mi)	Federal Park Property
— Roadside Trail* that has been Constructed (24 mi)	Floodplains
- - - Tier I Proposed Roadside Trail (6 mi)	Commercial Land Use
- - - Tier II Proposed Roadside Trail (14 mi)	Schools and Libraries
	County Boundary
	Major Roads
	Other Roads
	Railroads

* Roadside trails generally fall under the jurisdiction of the Gwinnett County Department of Transportation. The roadside trails shown in this map are not intended to represent a complete plan for the county. It shows only those roadside trails that are necessary to make connections between greenways, or serve as alternates to greenways where no off-road option is feasible.

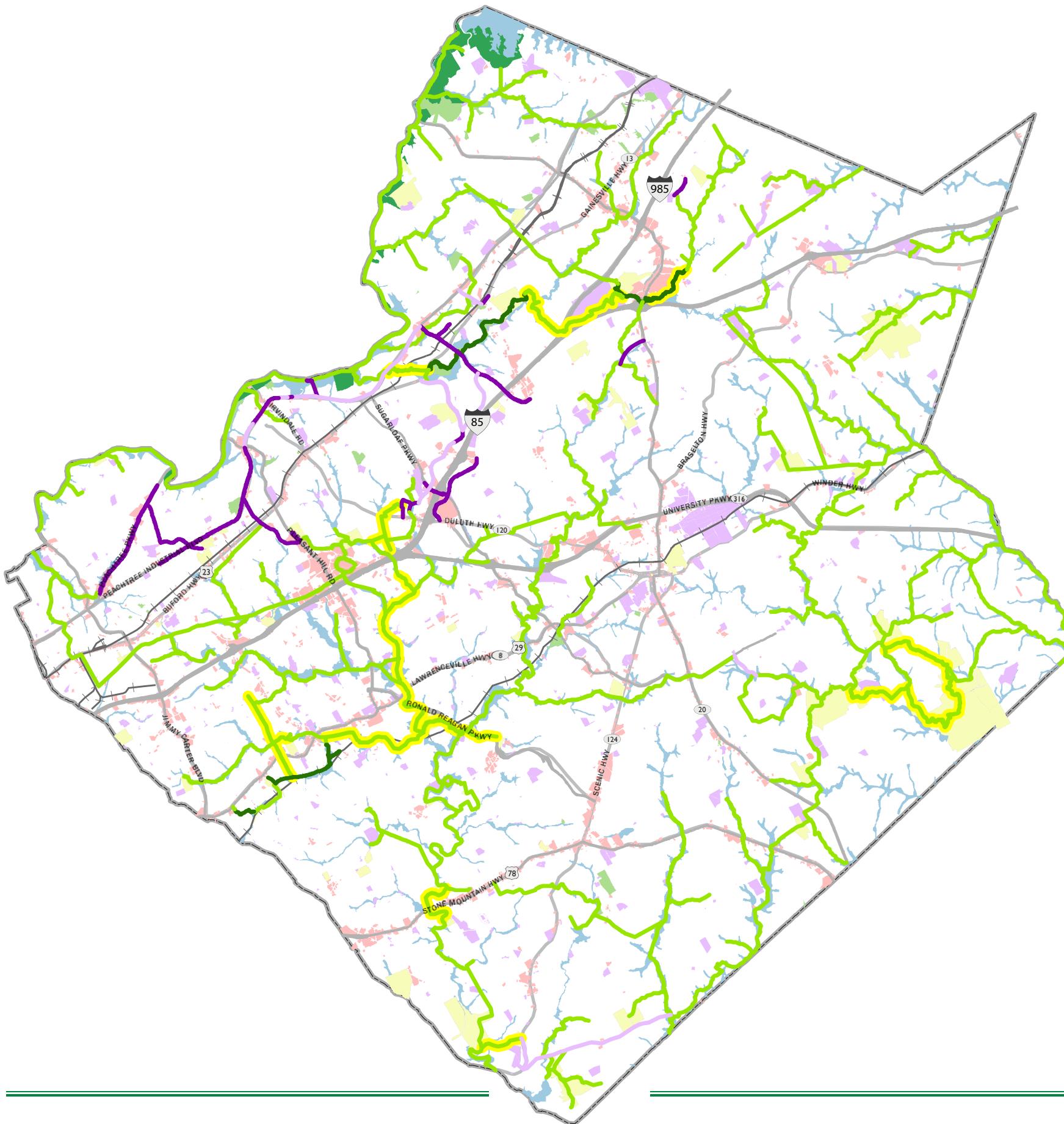
0 1.5 3 6 9 miles

Scale: 1 inch = 3 miles

Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County.



GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure D.2: Greenway Master Plan with Priority Indicator



LEGEND

Greenway that has been Constructed (11 mi)	County Park Property
Proposed Greenway (331 mi)	City Park Property
Roadside Trail* that has been Constructed (24 mi)	Federal Park Property
Proposed Roadside Trail* (20 mi)	Floodplains
Priority Proposed Greenways (33 mi)	Commercial Land Use
	Schools and Libraries
	County Boundary
	Major Roads
	Other Roads
	Railroads

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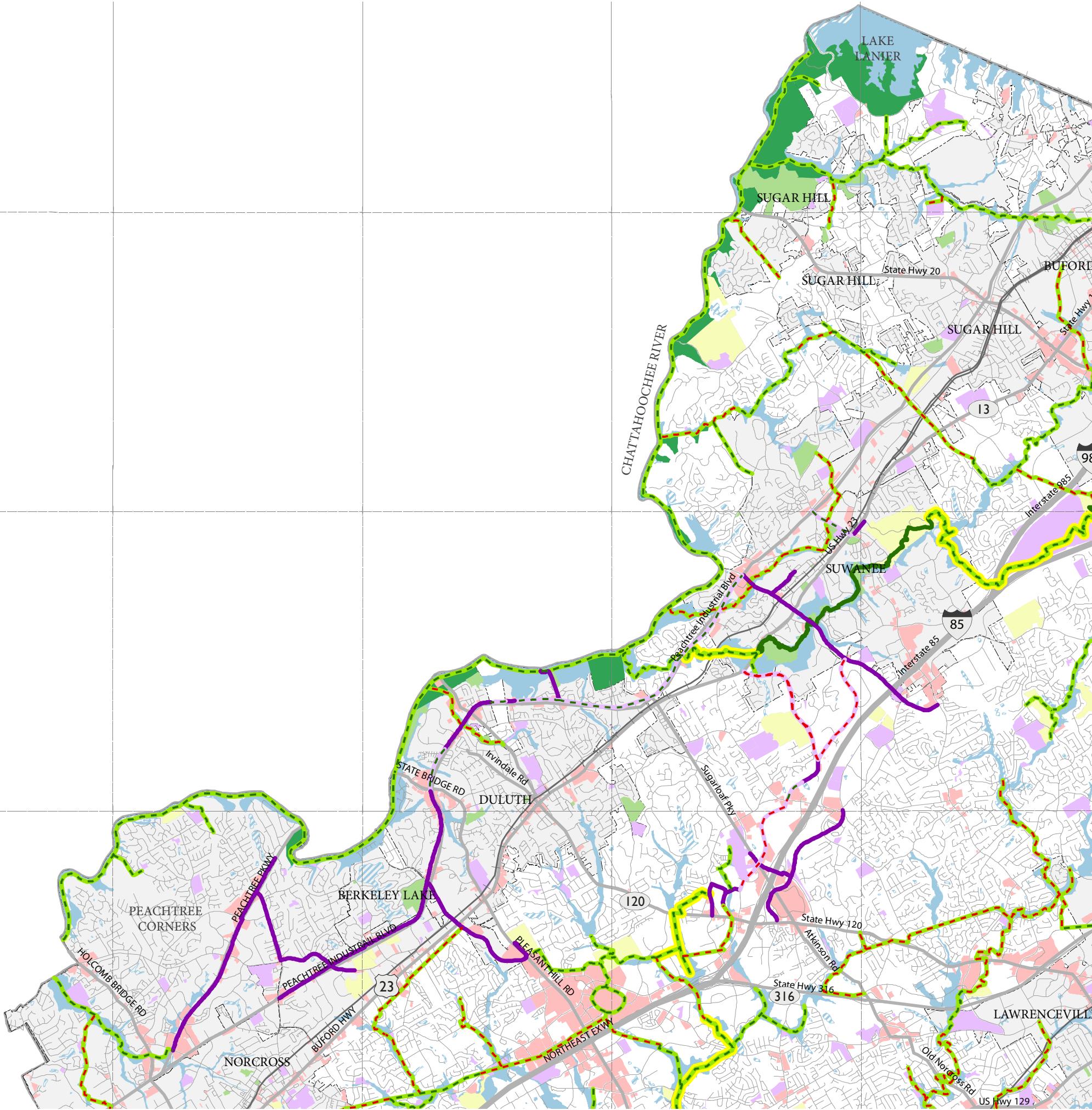
0 1.5 3 6 9 miles

Scale: 1 inch = 3 miles

Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County.



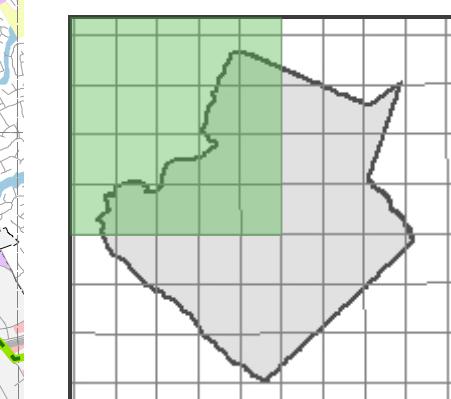
GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure D.3 - Proposed Greenways -
Northwest Quadrant



LEGEND

—	Greenway that has been Constructed	■	County Park Property
—	Proposed Greenway	■	City Park Property
—	Roadside Trail* that has been Constructed	■	Federal Park Property
—	Proposed Roadside Trail*	■	Floodplains
—	Tier I Overlay	■	Wetlands
—	Tier II Overlay	■	Commercial Land Use
—	Priority Projects	■	Schools and Libraries
—		□	County Boundary
—		□	City Boundary
—		—	Interstates
—		—	Major Roads
—		—	Other Roads
—		—	Railroads

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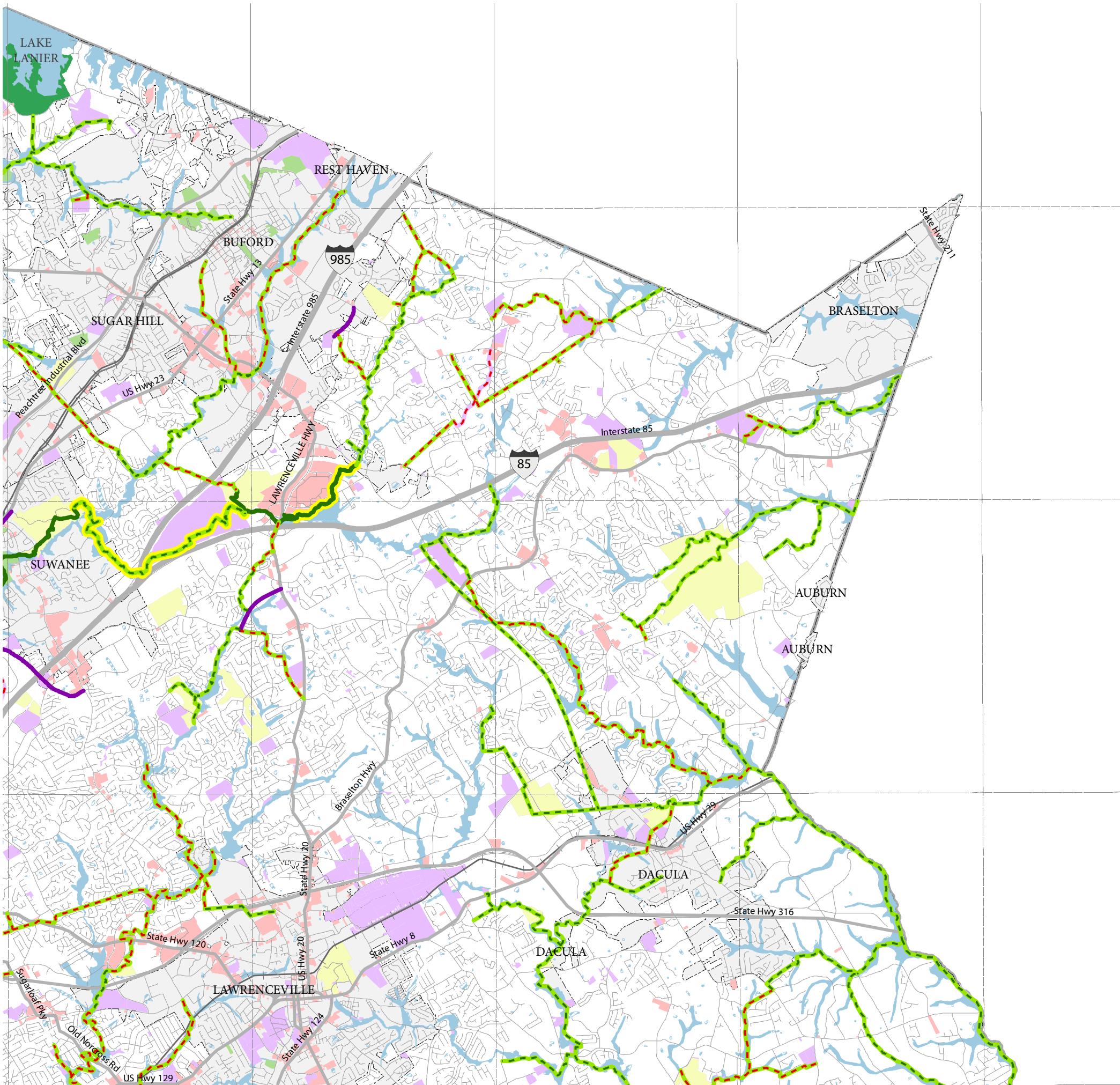
Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County, U.S. Geological Survey.

0 4,000 8,000 16,000 24,000 feet

Scale: 1 inch = 8,000 feet



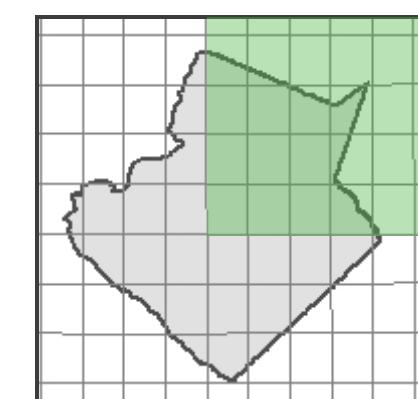
GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure D.4 - Proposed Greenways -
Northeast Quadrant



LEGEND

- Greenway that has been Constructed
- Proposed Greenway
- Roadside Trail* that has been Constructed
- Proposed Roadside Trail*
- - - Tier I Overlay
- - - Tier II Overlay
- Priority Projects
- County Park Property
- City Park Property
- Federal Park Property
- Floodplains
- Wetlands
- Commercial Land Use
- Schools and Libraries
- County Boundary
- City Boundary
- Interstates
- Major Roads
- Other Roads
- Railroads

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Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County, U.S. Geological Survey.

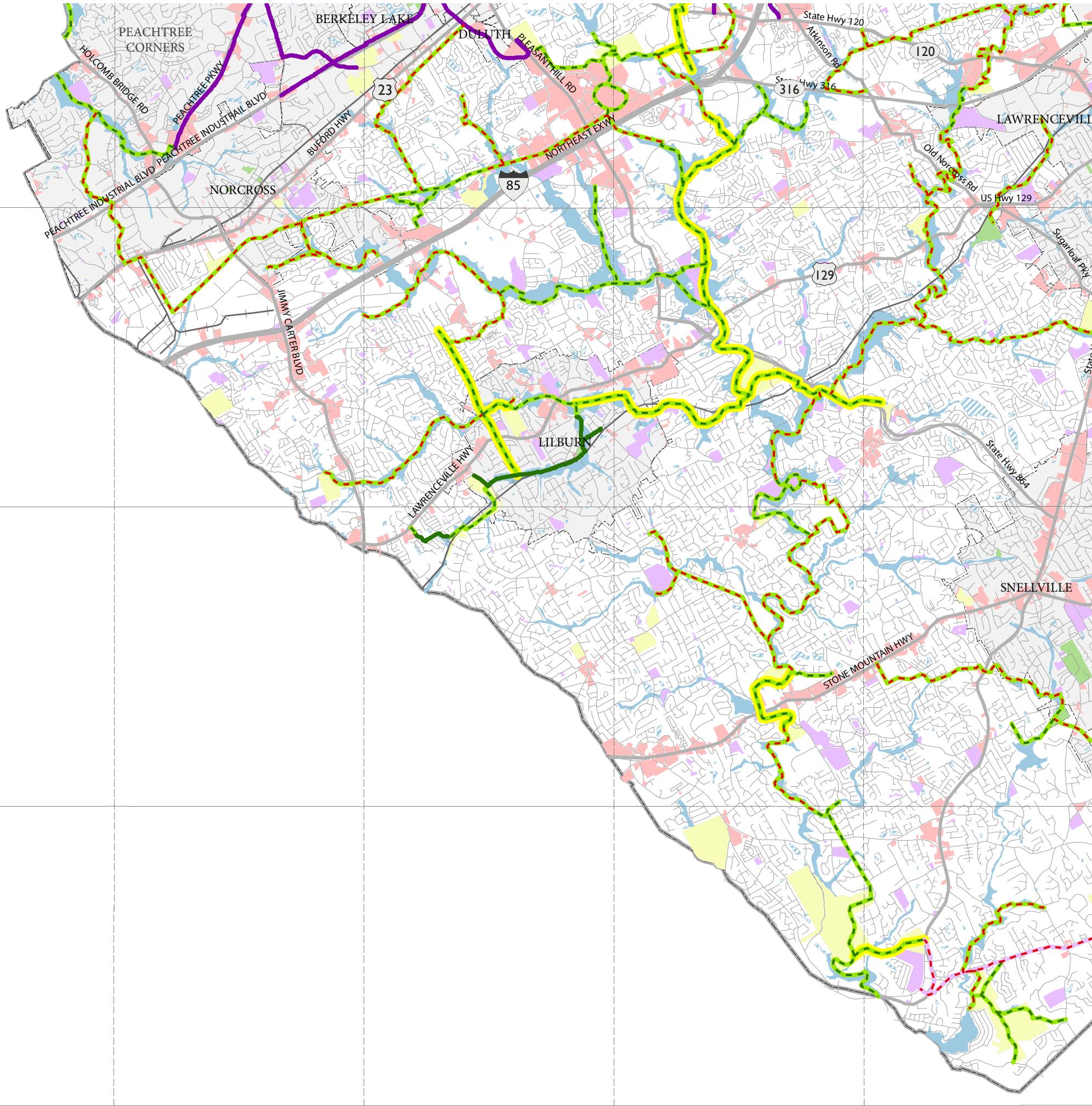
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Scale: 1 inch = 8,000 feet





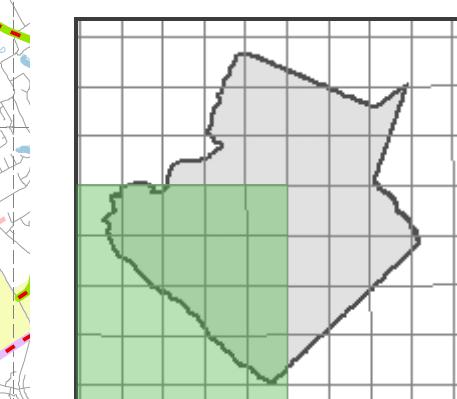
GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure D.5 - Proposed Greenways -
Southwest Quadrant



LEGEND

- Greenway that has been Constructed
- Proposed Greenway
- Roadside Trail* that has been Constructed
- Proposed Roadside Trail*
- Tier I Overlay
- Tier II Overlay
- Priority Projects
- County Park Property
- City Park Property
- Federal Park Property
- Floodplains
- Wetlands
- Commercial Land Use
- Schools and Libraries
- County Boundary
- City Boundary
- Interstates
- Major Roads
- Other Roads
- Railroads

* Roadside trails generally fall under the jurisdiction of the Gwinnett County Department of Transportation. The roadside trails shown in this map are not intended to represent a complete plan for the county. It shows only those roadside trails that are necessary to make connections between greenways, or serve as alternates to greenways where no off-road option is feasible.



Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County, U.S. Geological Survey.

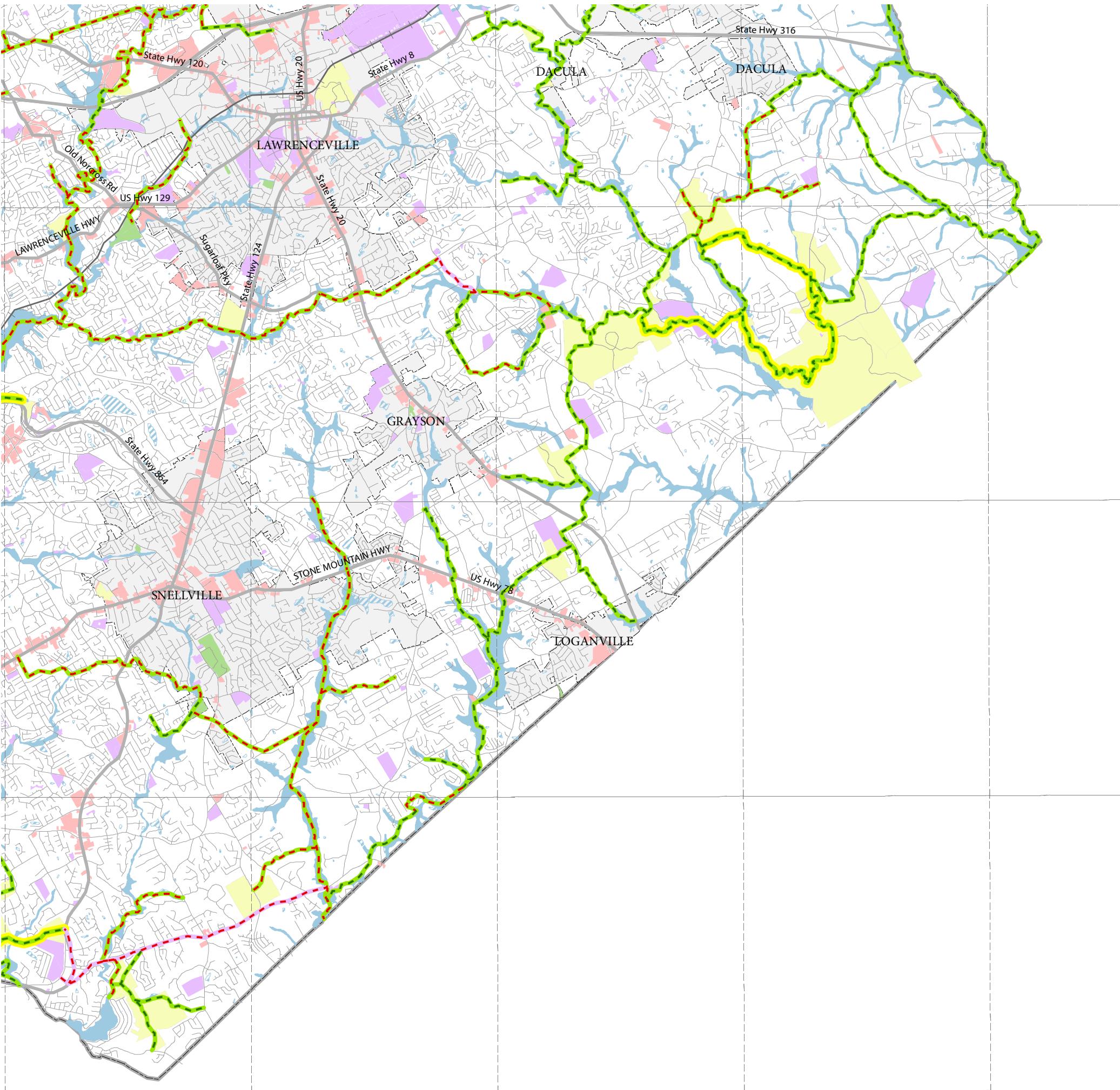
0 4,000 8,000 16,000 24,000 feet

Scale: 1 inch = 8,000 feet



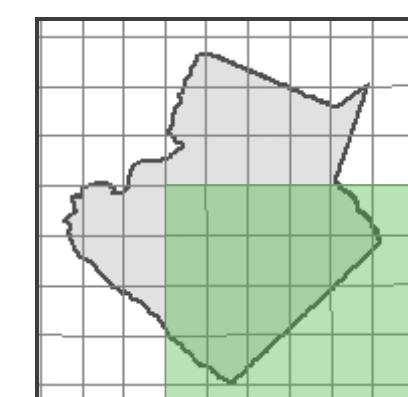


GWINNETT COUNTY, GEORGIA
GREENWAYS & OPEN SPACE MASTER PLAN UPDATE
Figure D.6 - Proposed Greenways -
Southeast Quadrant



LEGEND

- Greenway that has been Constructed
- Proposed Greenway
- Roadside Trail* that has been Constructed
- Proposed Roadside Trail*
- Tier I Overlay
- Tier II Overlay
- Priority Projects
- County Park Property
- City Park Property
- Federal Park Property
- Floodplains
- Wetlands
- Commercial Land Use
- Schools and Libraries
- County Boundary
- City Boundary
- Interstates
- Major Roads
- Other Roads
- Railroads



* Roadside trails generally fall under the jurisdiction of the Gwinnett County Department of Transportation. The roadside trails shown in this map are not intended to represent a complete plan for the county. It shows only those roadside trails that are necessary to make connections between greenways, or serve as alternates to greenways where no off-road option is feasible.

Data Sources: Atlanta Regional Commission, Fish & Wildlife Service, Gwinnett County, U.S. Geological Survey.

0 4,000 8,000 16,000 24,000 feet

Scale: 1 inch = 8,000 feet

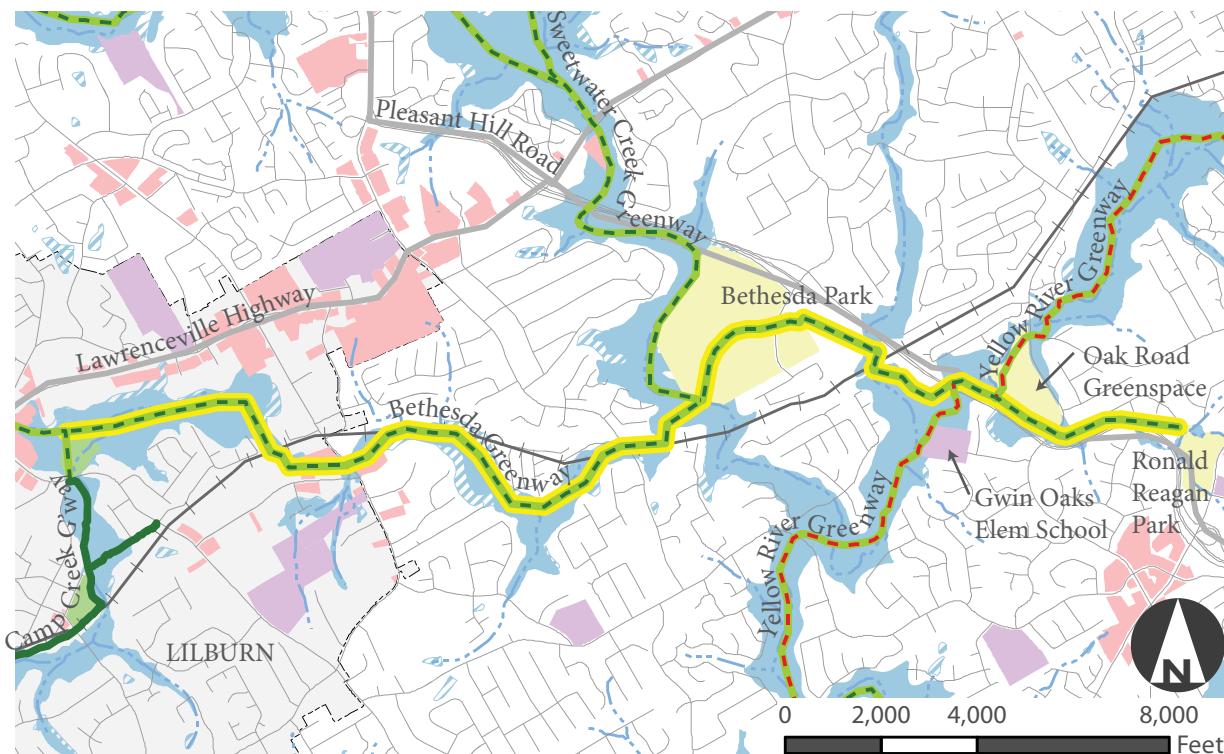


E. Priority Greenway Descriptions

Bethesda Greenway

This greenway acts as a continuation of the existing Camp Creek Greenway in Lilburn. Beginning in the west near the Lilburn Assembly of God Church, the greenway follows Jackson Creek to Bethesda Park and Gwinnett Senior Center. The trail then intersects Gwin Oaks Elementary School, crosses Ronald Reagan Parkway, and terminates at Ronald Reagan Park. In total, the trail will be approximately 5.4

miles in length and will require several railroad crossings.

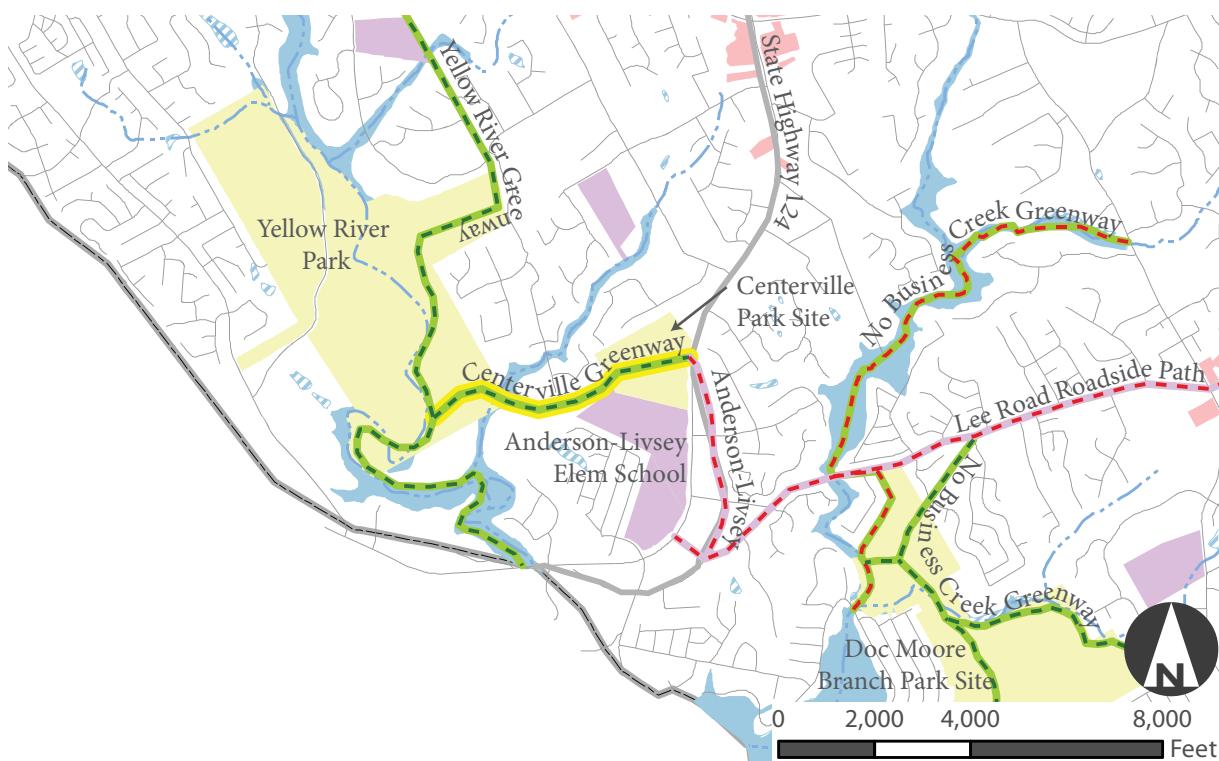


LEGEND

Greenway that has been Constructed	Bethesda Greenway	County Park Property
Proposed Greenway	Interstates	City Park Property
Roadside Trail that has been Constructed	Major Roads	Federal Park Property
Proposed Roadside Trail	Other Roads	Floodplains
Tier I Overlay	Railroads	Wetlands
Tier II Overlay	Rivers and Streams	Commercial Land Use
	County Boundary	Schools and Libraries
	City Boundary	

Centerville Greenway

At just over 1 mile in length, this greenway serves to connect Yellow River Park to State Highway 124, and the proposed Anderson-Livsey Roadside Path. On its way, it serves to connect Anderson-Livsey Elementary School to the greenway network. This small greenway would be the first greenway segment to be constructed in this part of the county.

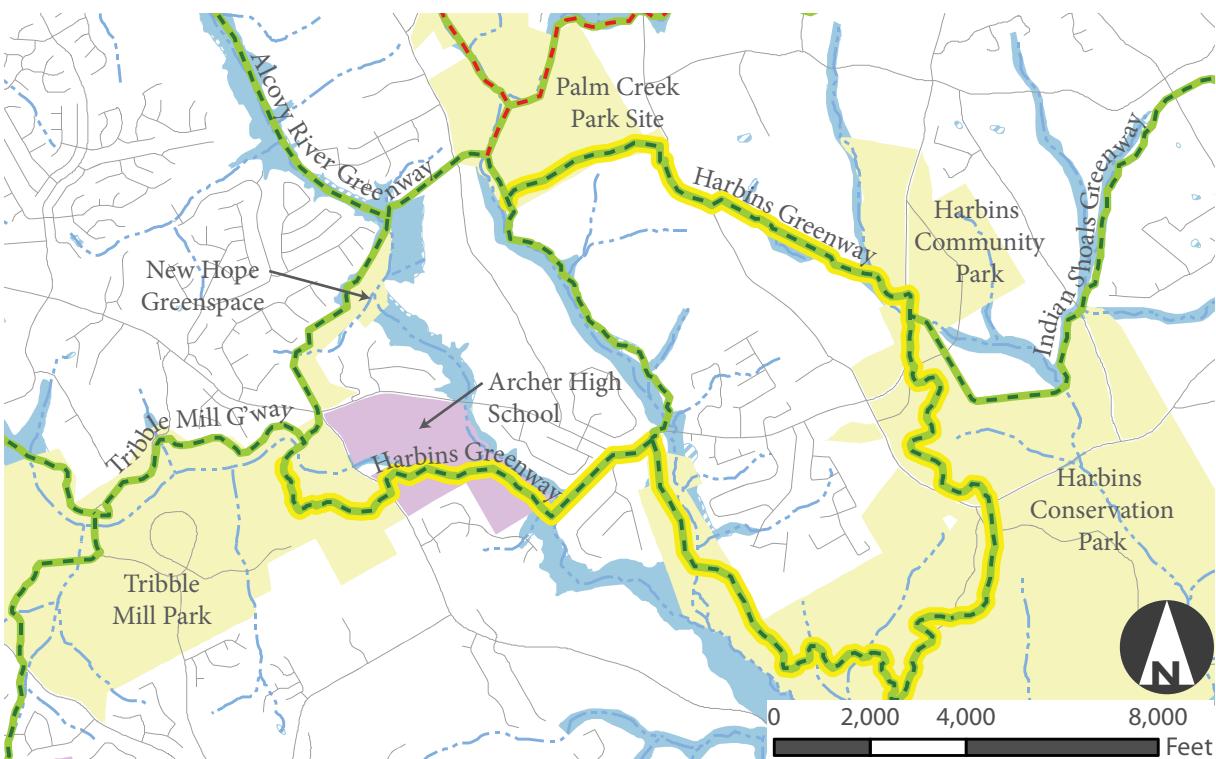


LEGEND

Greenway that has been Constructed	Centerville Greenway	County Park Property
Proposed Greenway		City Park Property
Roadside Trail that has been Constructed		Federal Park Property
Proposed Roadside Trail		Floodplains
Tier I Overlay		Wetlands
Tier II Overlay		Commercial Land Use
	Interstates	Schools and Libraries
	Major Roads	
	Other Roads	
	Railroads	
	Rivers and Streams	
	County Boundary	
	City Boundary	

Harbins Greenway

This greenway serves to connect three major Gwinnett County Parks: Harbins Conservation Park, Tribble Mill Park, and Palm Creek Park Site, largely via natural drainage corridors. It is mostly constructed on land already owned by the county. In addition to the three parks, this greenway will also intersect with Archer High School.



LEGEND

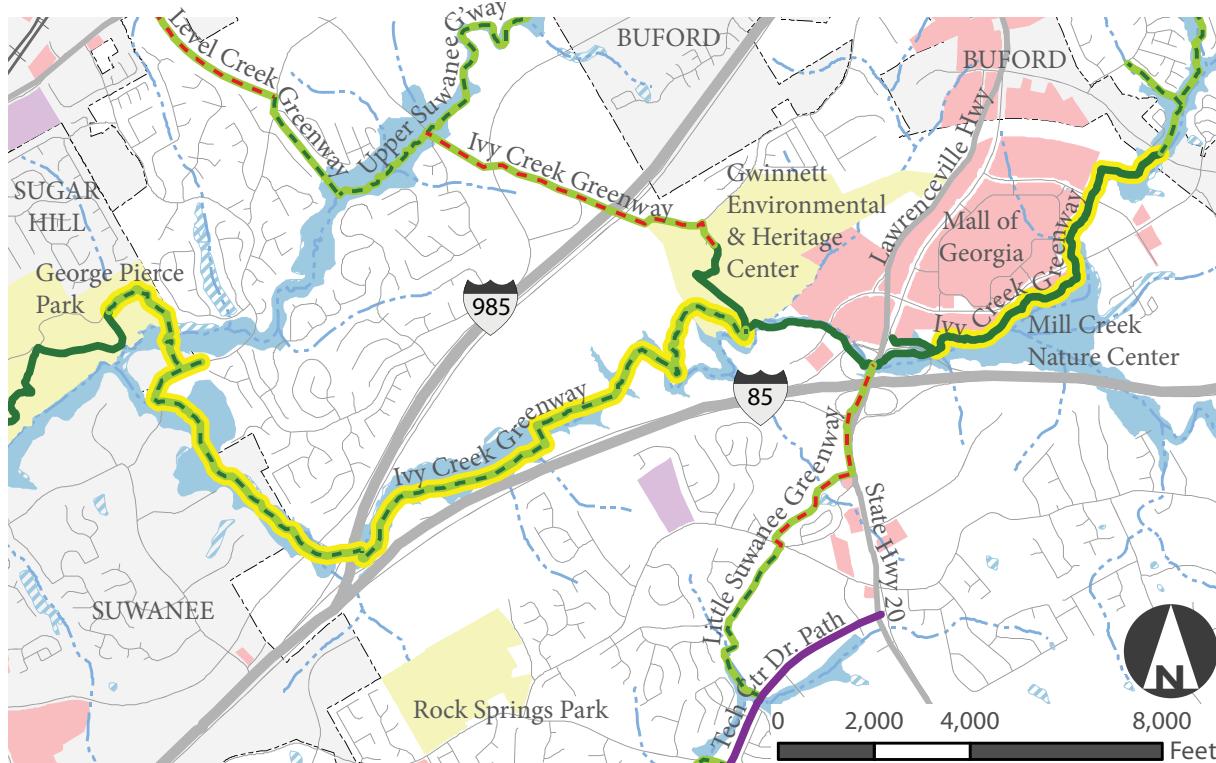
Greenway that has been Constructed	Harbins Greenway	County Park Property
Proposed Greenway	Interstates	City Park Property
Roadside Trail that has been Constructed	Major Roads	Federal Park Property
Proposed Roadside Trail	Other Roads	Floodplains
Tier I Overlay	Railroads	Wetlands
Tier II Overlay	Rivers and Streams	Commercial Land Use
	County Boundary	Schools and Libraries
	City Boundary	

Ivy Creek Greenway

As one of the first greenways in the county, Ivy Creek Greenway enjoys both high visibility and popularity. Completing this section of greenway is an important step in forging a connective link in the county-wide greenway network.

Highlights of the greenway include the Gwinnett Environmental and Heritage Center, Woodward Mill Historic Site, Mill Creek Nature Center Site, the Mall of Georgia, and George Pierce Park.

The portion of Ivy Creek Greenway that runs through the Mill Creek Nature Center is currently unpaved, and paving this portion of trail is also a priority.



LEGEND

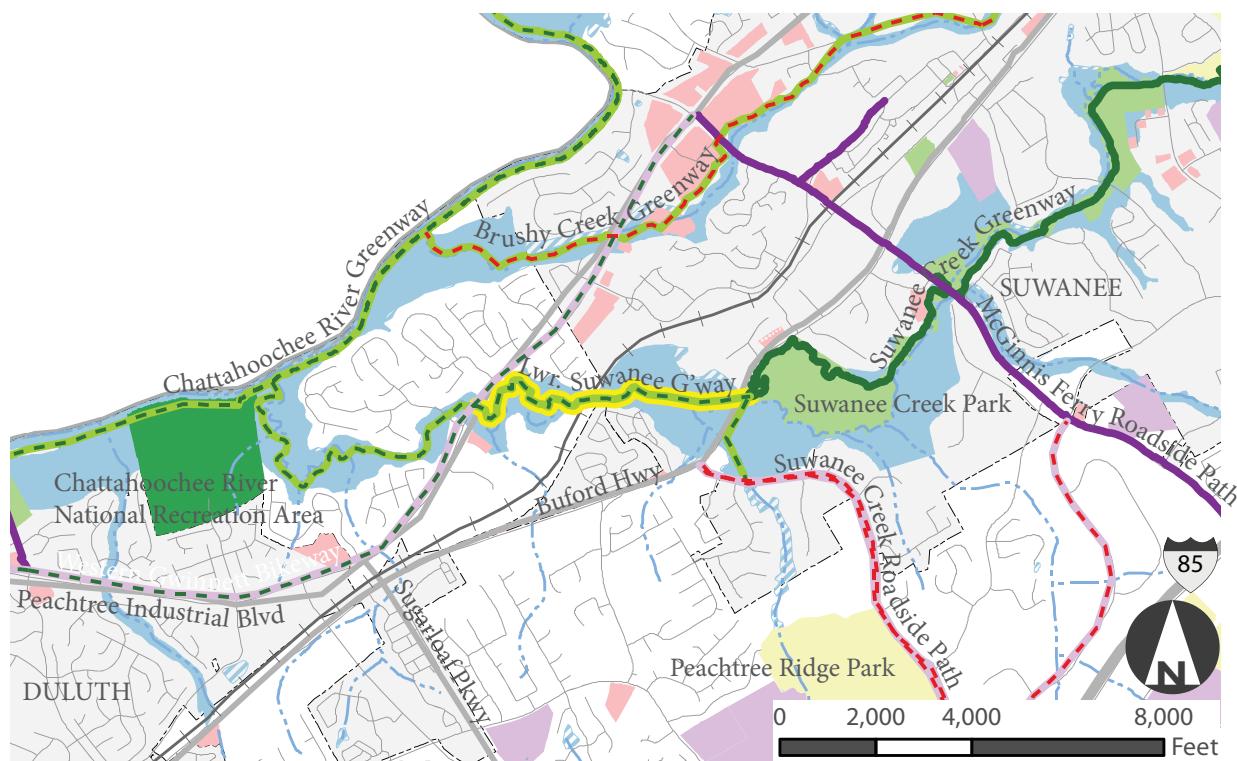
Greenway that has been Constructed	Ivy Creek Greenway	County Park Property
Proposed Greenway	Interstates	City Park Property
Roadside Trail that has been Constructed	Major Roads	Federal Park Property
Proposed Roadside Trail	Other Roads	Floodplains
Tier I Overlay	Railroads	Wetlands
Tier II Overlay	Rivers and Streams	Commercial Land Use
	County Boundary	Schools and Libraries
	City Boundary	



Lower Suwanee Greenway

This greenway is a continuation of the existing Suwanee Creek Greenway, which also intersects with Ivy Creek Greenway to the north.

Approximately 1.4 miles in length, the trail segment picks up where the existing greenway leaves off, extending the corridor to Peachtree Industrial Boulevard, and the proposed extension of the Western Gwinnett Bikeway.

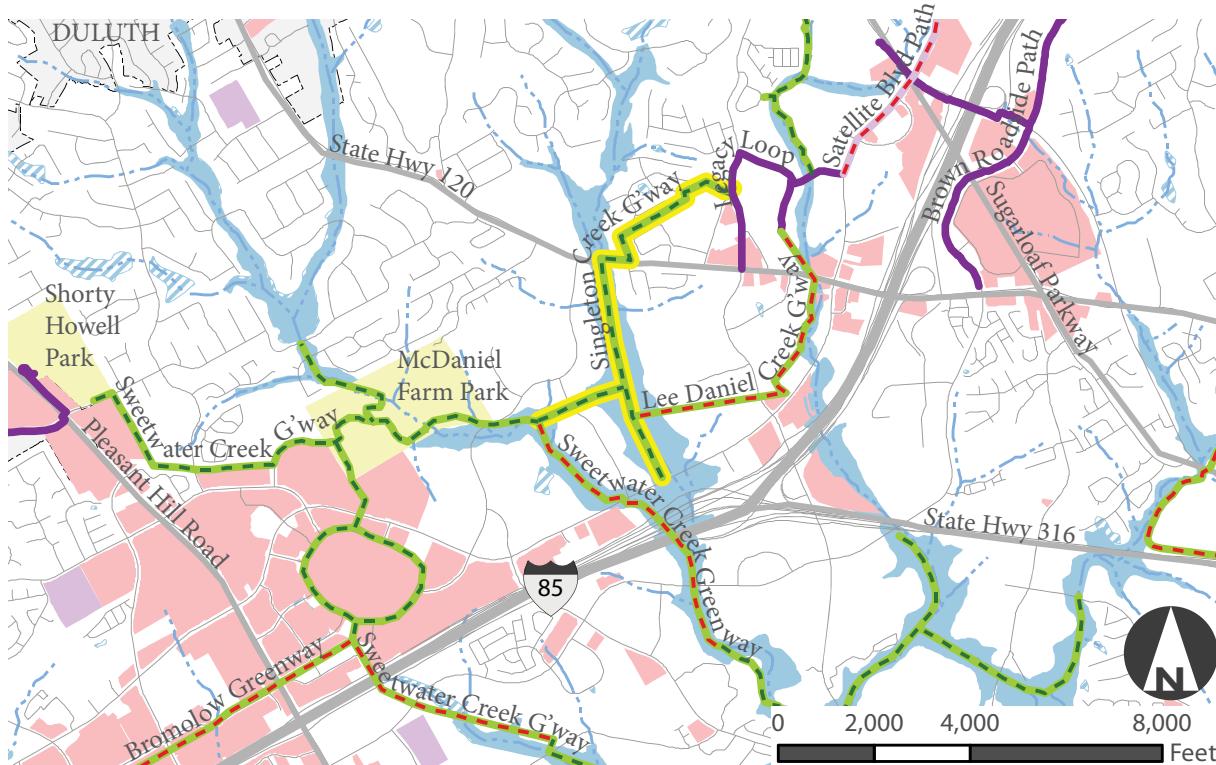


LEGEND

Singleton Creek Greenway

Not to be confused with Singleton Greenway, Singleton Creek Greenway uses existing utility easements, road right-of-way, and creeks to create a small trail segment approximately 1.3 miles in length. The trail has two beginning points to the south, one at the intersection of Satellite Boulevard and Singleton Creek and one at Sweetwater Creek and an existing power easement. After merging, the two travel along

Singleton Creek north to cross State Highway 120 where it skirts a multifamily housing development and intersects with Meadow Church Road.



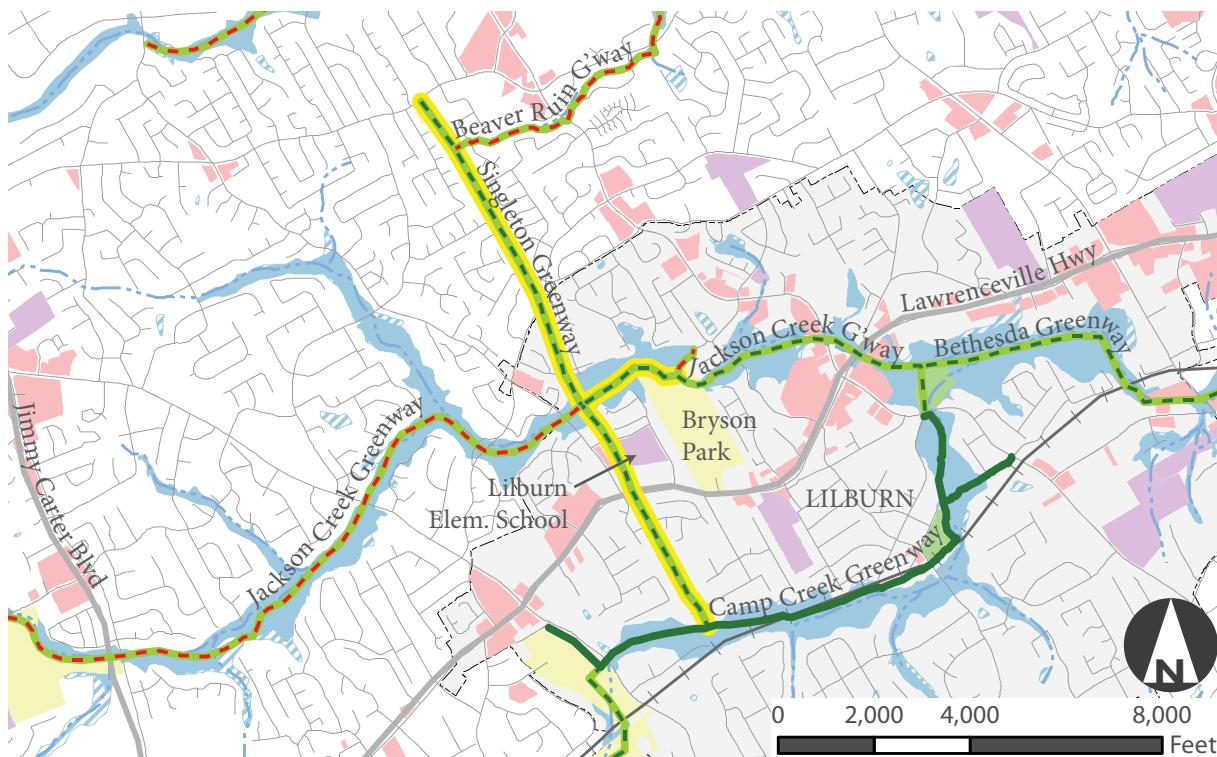
LEGEND

Greenway that has been Constructed	Singleton Creek Greenway	County Park Property
Proposed Greenway		City Park Property
Roadside Trail that has been Constructed		Federal Park Property
Proposed Roadside Trail		Floodplains
Tier I Overlay		Wetlands
Tier II Overlay		Commercial Land Use
	Interstates	Schools and Libraries
	Major Roads	
	Other Roads	
	Railroads	
	Rivers and Streams	
	County Boundary	
	City Boundary	

Singleton Greenway

This greenway intersects and builds upon the existing Camp Creek Greenway in Lilburn, extending northward using an existing power utility easement. Approximately 2.8 miles in length, the prioritized trail includes a short section of Jackson Creek Greenway. Highlights of the greenway will include connections to Bryson Park, Lilburn Elementary School, numerous

neighborhoods, and the Singleton Road Activity Building, where the greenway will terminate.



LEGEND

—	Greenway that has been Constructed	—	Singleton Greenway	—	County Park Property
—	Proposed Greenway	—	Interstates	—	City Park Property
—	Roadside Trail that has been Constructed	—	Major Roads	—	Federal Park Property
—	Proposed Roadside Trail	—	Other Roads	—	Floodplains
—	Tier I Overlay	—	Railroads	—	Wetlands
—	Tier II Overlay	—	Rivers and Streams	—	Commercial Land Use
		□	County Boundary	—	Schools and Libraries
		□	City Boundary		

Sweetwater Creek Greenway

This greenway runs alongside Sweetwater Creek for a distance of approximately 5.5 miles. Commencing in the south at Bethesda Park, the trail runs northward along the creek, connecting to Sweetwater Middle School and Club Drive Park, passing through Northwood Country Club, and terminating near multifamily housing at Sweetwater Road.

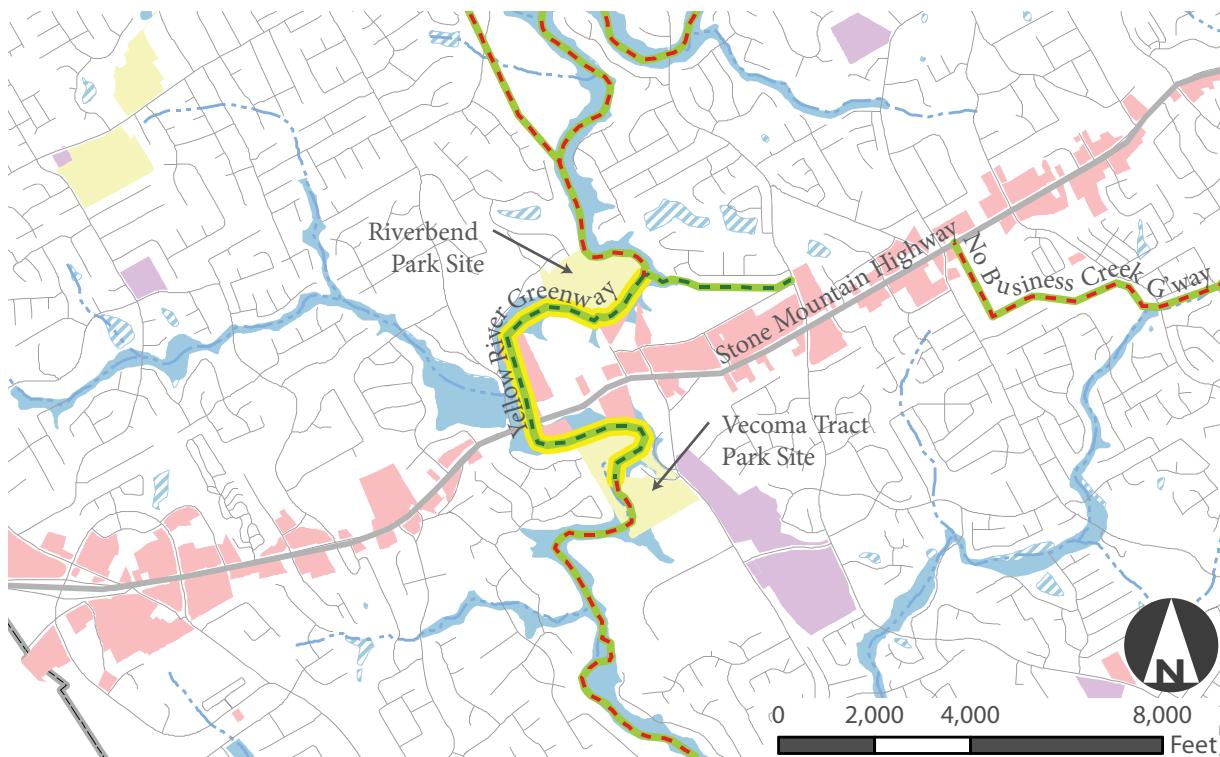


LEGEND

—	Greenway that has been Constructed or Funded	—	Sweetwater Creek Greenway	—	County Park Property
—	Proposed Greenway	—	Interstates	—	City Park Property
—	Roadside Trail that has been Constructed or Funded	—	Major Roads	—	Federal Park Property
—	Proposed Roadside Trail	—	Other Roads	—	Floodplains
—	Tier I Overlay	—	Railroads	—	Wetlands
—	Tier II Overlay	—	Rivers and Streams	—	Commercial Land Use
		—	County Boundary	—	Schools and Libraries
		—	City Boundary		

Yellow River Greenway

This greenway segment commences the development of the Yellow River corridor, one of the longer greenways planned for the county. Approximately 1.8 miles in length, this priority trail segment crosses beneath Stone Mountain Highway, connecting Riverbend Park Site and Vecoma Tract Park Site and features connections to the Yellow River Game Ranch.



LEGEND

—	Greenway that has been Constructed or Funded	—	Yellow River Greenway	—	County Park Property
—	Proposed Greenway	—	Interstates	—	City Park Property
—	Roadside Trail that has been Constructed or Funded	—	Major Roads	—	Federal Park Property
—	Proposed Roadside Trail	—	Other Roads	—	Floodplains
—	Tier I Overlay	—	Railroads	—	Wetlands
—	Tier II Overlay	—	Rivers and Streams	—	Commercial Land Use
		□	County Boundary	□	Schools and Libraries
		□	City Boundary		

F. Trail Design Standards

This chapter describes minimum design standards for implementation of the Gwinnett County Greenway Network. These standards are based on best practices and accepted guidelines for greenway facilities throughout the United States and should apply to both public and private off-road additions to the Gwinnett County Greenway Network. Application of these standards will ensure that all aspects of the greenway vision are met through consistent design. It does not address the design of on-road systems, sidewalks, bike lanes, or other transportation devices that fall within the right-of-way of a road, with the exception of off-road trail to roadway intersections.

The standards contained herein are general in nature and are written with an understanding that adjustments may be necessary to achieve the best result in physically constrained situations. Because greenway facility design is a broad topic that covers many issues, the drawings and standards outlined in this document should not be interpreted as a substitute for more thorough, site-specific professional design and engineering work. Each segment of the greenway network should be evaluated, designed, and constructed in consultation with qualified professional engineers and landscape architects.

Who should use this guide?

- Private developers, landscape architects, engineers, and planning officials will use this document during the design process.
- Gwinnett County officials and advisory boards will use this document to understand and execute the standards for all off-road trails in Gwinnett County.

Accessibility

The US Access Board is an independent agency devoted to accessibility for people with disabilities. In most cases, the Board develops “guidelines,” which do not directly affect the public but instead serve as the basis for “standards” issued by other agencies, which do. In this sense, Board guidelines serve as the minimum baseline for the enforceable standards. Board guidelines and standards include:

- ADA Accessibility Guidelines (ADAAG) for Buildings and Facilities 2010
- ADA Accessibility Guidelines (ADAAG) for Transportation Facilities (update underway)
- ADA Accessibility Guidelines (for federally funded facilities)

The Board is currently developing:

- Guidelines for Outdoor Developed Areas (Draft Final 2009)
- Guidelines for Public Rights-of-Way & Supplemental Rule to Address Access to Shared-Use Paths

ADA standards govern the construction and alteration of places of public accommodation, commercial facilities, and state and local government facilities, both indoor and outdoor including sidewalks and parking facilities. The Department of Justice (DOJ) maintains ADA standards that apply to all ADA facilities except transportation facilities, which are subject to similar standards issued by the Department of Transportation (DOT).

For the purposes of Greenway Development in Gwinnett County the DOT ADA standards are applicable, as well as the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 2012, 4th Edition. As noted the Access Board is also developing guidelines for outdoor developed areas, which while important do not override the DOT ADA and AASHTO precedents for multi-use trail facilities.

Eventually the Access Board's *Proposed Guidelines*



for Public Rights-of-Way and Supplemental Rule to Address Access to Shared-Use Paths will be finalized. They will become mandatory and enforceable once implemented by the US Departments of Transportation and Justice.

For the latest accessible design information, all interested parties shall check with the United States Access Board at www.access-board.gov

Regulations governing public facilities and accessibility guidelines are always being improved upon and updated accordingly. Ultimately, it is the responsibility of the design team to understand and apply these regulations where appropriate.

References

The following documents should be used in the design of greenway facilities. While not exhaustive, these sources will give the design team a good start in developing safe, accessible facilities.

Guide for the Planning, Design, and Operation of Bicycle Facilities.

4th ed. 2012 by AASHTO

Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Published by AASHTO, 2004

2010 ADA Standards for Accessible Design.

Published by the Department of Justice, Sept. 15, 2010

Manual on Uniform Traffic Control Devices (MUTCD).

Published by the U.S. Department of Transportation, 2009, with revisions 1 and 2 dated May 2012

Trails for the Twenty-First Century.

Published by Island Press, 2nd ed. 2001. Authors: Charles A. Flink, Robert Searns, and Kristine Olka

Urban Bikeway Design Guide.

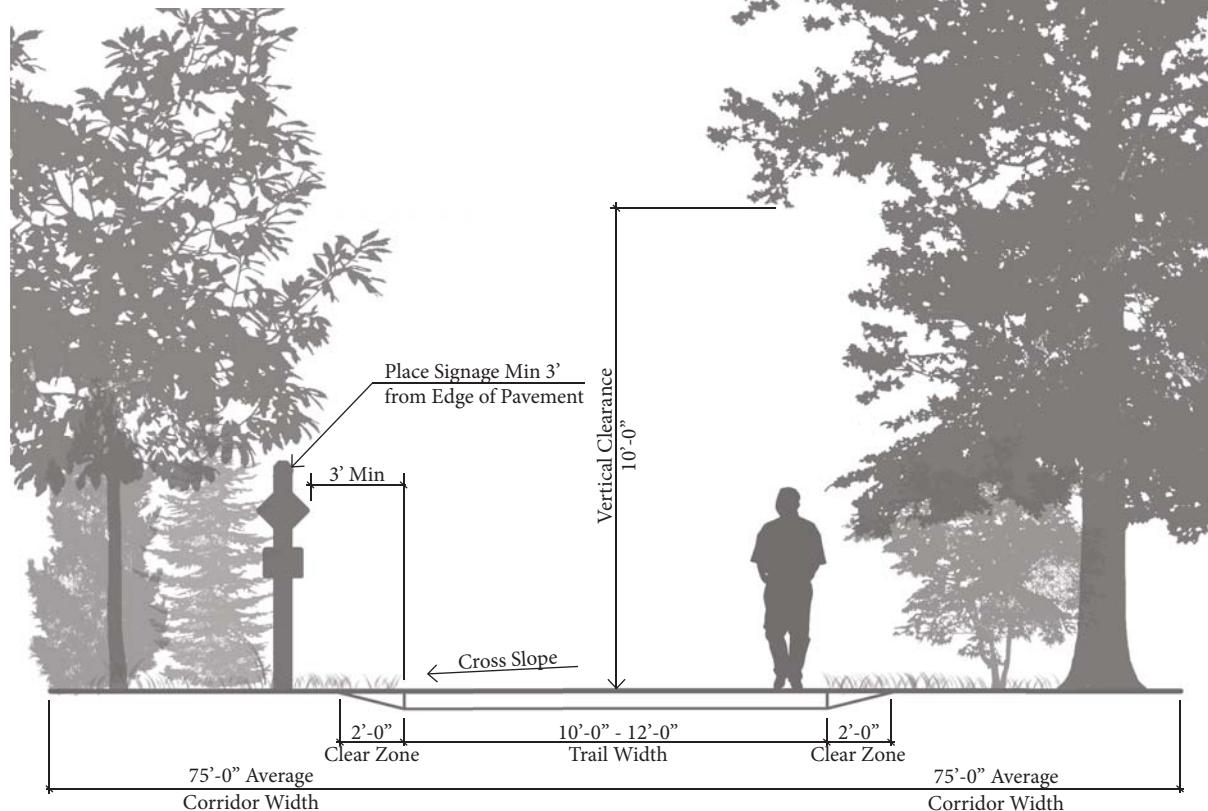
Published by National Association of City Transportation Officials, 2nd ed. 2012.

Greenway Trail (Surface & Corridor)

Greenways, or multiuse off-road trails, are typically 12' wide to provide two-way travel and serve a variety of users, including walkers, runners, and bicyclists.

All trails shall:

- be ADA compliant
- be designed in accordance with AASHTO provisions
- have a two-foot minimum cleared graded shoulder on both sides
- have a painted centerline stripe to control traffic direction
- respect state and local stream buffer requirements, variances excepted
- minimize land disturbance and preserve trees
- replace trees in accordance with Gwinnett County regulations
- mitigate concentrated flows of stormwater using best practices



Boardwalk

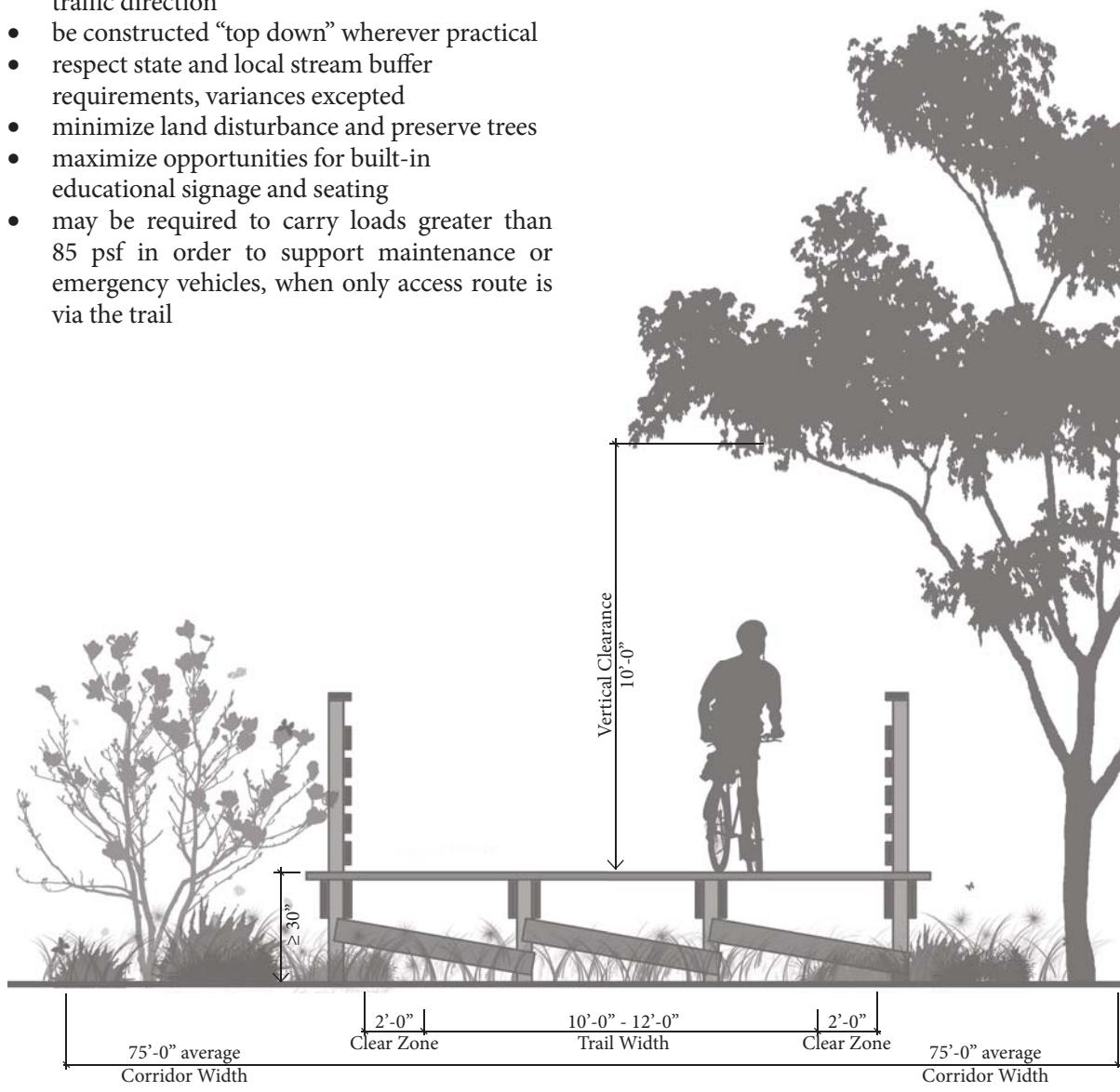
Boardwalks may be used in environmentally sensitive areas, wetlands, or poorly-drained areas, where they function as “mini-bridges.”

All boardwalks shall:

- be ADA compliant
- be designed in accordance with AASHTO provisions
- be designed in accordance with US Army Corps of Engineers regulations
- have a painted centerline stripe to control traffic direction
- be constructed “top down” wherever practical
- respect state and local stream buffer requirements, variances excepted
- minimize land disturbance and preserve trees
- maximize opportunities for built-in educational signage and seating
- may be required to carry loads greater than 85 psf in order to support maintenance or emergency vehicles, when only access route is via the trail

DESIGN STANDARDS AT-A-GLANCE

Width.....	Equal to width of trail plus 2'-0" clear zone OR equal to width of trail
Vertical Clearance.....	10'-0"
Surface.....	Non-Toxic Treated Wood or Composite Lumber
Decking Thickness.....	2" minimum
Safety Railings.....	Required when height of boardwalk exceeds 30"
Pedestrian Load.....	85 psf min
Alt Vehicular Load.....	5 tons



Bridge/Overpass

Bridges and overpasses provide access to trail users over certain natural or constructed features such as rivers, streams, and busy roadways.

All bridges and overpasses shall:

- be ADA compliant
- be designed in accordance with AASHTO provisions
- be aligned as close to perpendicular to the feature it is crossing as practical
- be located away from bends in rivers and streams with unstable soils
- be designed to minimize impact to published 100 yr FEMA flood elevations, OR be designed to rest above the ordinary high water mark of streams and cabled as a breakaway bridge
- require staging access for large cranes, other heavy equipment, and concrete deliveries during construction
- be outfitted with bicycle-safe expansion joints

DESIGN STANDARDS AT-A-GLANCE

<i>Width.....</i>	<i>Equal to width of trail, min.</i> <i>OR equal to width of trail plus 2'-0" clear zone</i>
<i>Surface Material.....</i>	<i>Concrete or Wood</i>
<i>Supporting Structure.....</i>	<i>Weathering Steel</i>
<i>Safety Railings.....</i>	<i>48" - 54"</i>
<i>Pedestrian Load.....</i>	<i>85 psf</i>
<i>Alt Vehicle Loading.....</i>	<i>5 tons min - 10 tons max</i>



Note:
Illustration is not intended to dictate bridge style. Many styles of bridges are available and should be considered.

Tunnel/Underpass

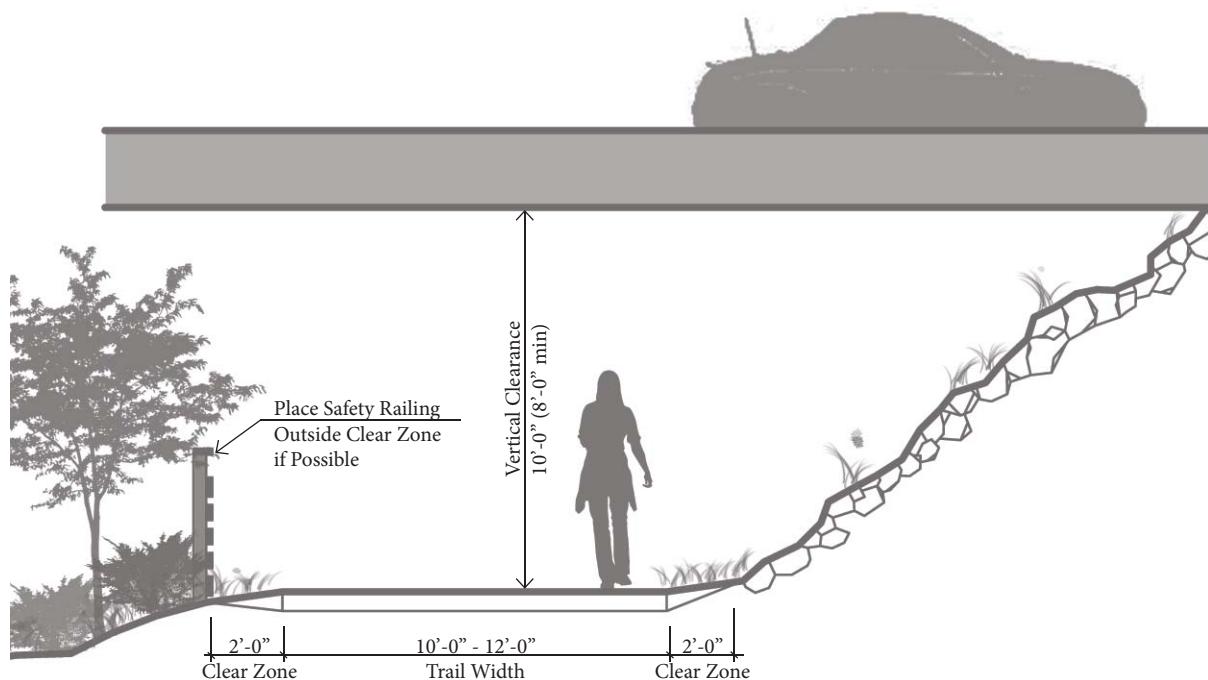
Tunnels may be retrofitted existing facilities or newly constructed to accommodate trail users. Underpasses most typically occur when a trail passes beneath an existing roadway or rail bridge, often adjacent to streams or rivers. Proper design and engineering are absolutely necessary to provide the safest possible tunnel or underpass condition for trail users.

All underpasses shall:

- be ADA compliant
- have a painted centerline stripe to control traffic direction
- be used sparingly in rural areas
- respect state and local stream buffer requirements, variances excepted
- have positive drainage to avoid pooling of stormwater inside the underpass
- utilize approach and warning signs to alert trail users to tunnels and underpasses
- may include supplemental lighting

DESIGN STANDARDS AT-A-GLANCE

Width.....	Equal to width of trail plus 2'-0" clear zone OR as wide as possible in constrained areas
Vertical Clearance.....	10'-0" min (8'-0" in constrained areas)
Safety Railings.....	Required when trail is adjacent to parallel water hazards, downward slopes equal to or steeper than 3:1, or vehicular travel lanes



Retaining Wall

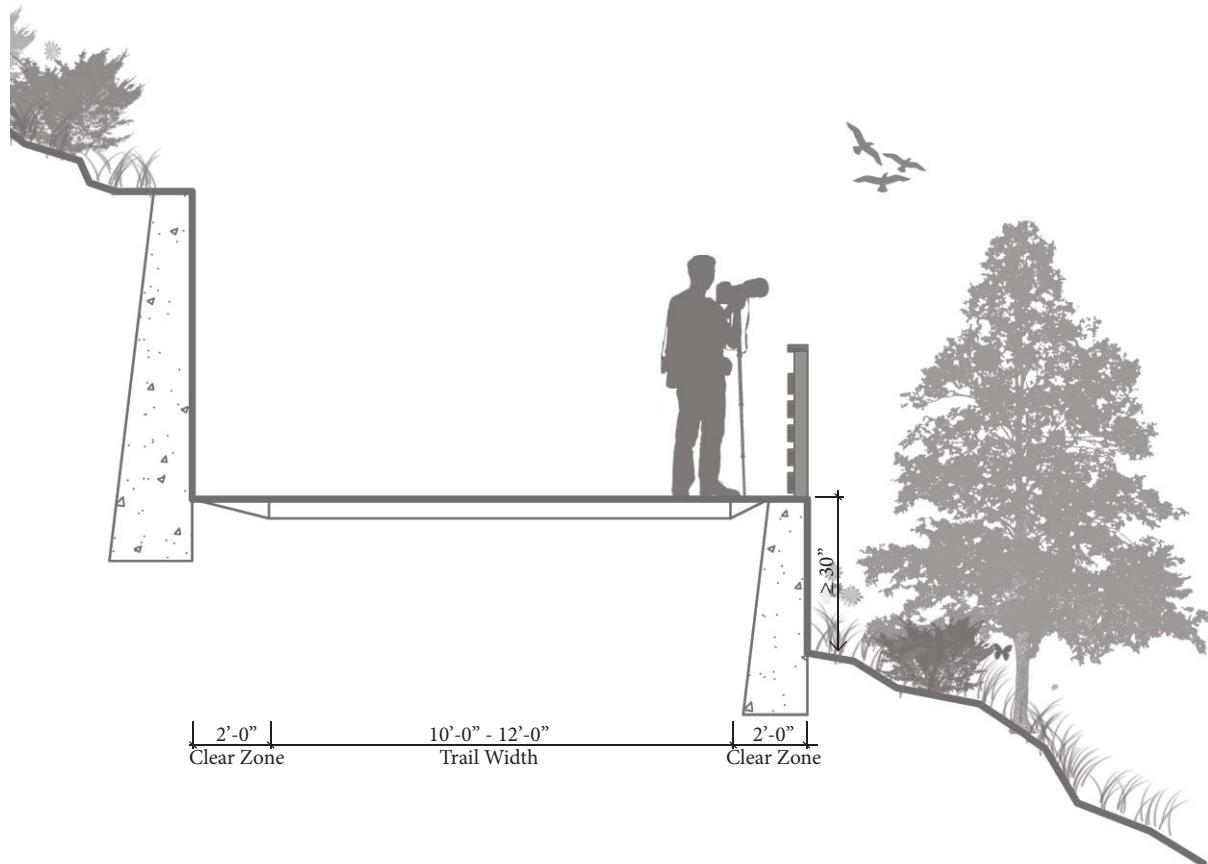
Retaining walls may be necessary in areas that require substantial changes in topography to conform to vertical alignment requirements.

All retaining walls shall:

- be professionally designed by a qualified structural engineer
- respect state and local stream buffer requirements, variances excepted
- require safety railings when trail is elevated above adjacent grades greater than 30"
- anti-graffiti coating is recommended

DESIGN STANDARDS AT-A-GLANCE

Material.....	Poured Concrete or Granite Rubble
Finish.....	Smooth Concrete, Concrete Form-Liner Patterns (typically stone), Coursed or Uncoursed Stone
Safety Railings.....	48" height, min





Safety Railing

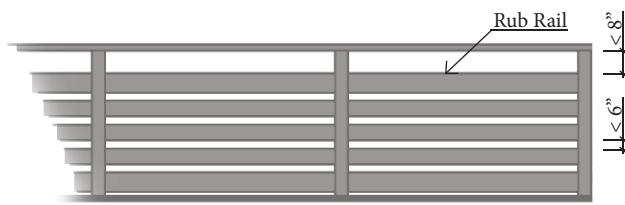
Safety railings are important safety features on bridges, some boardwalks, some retaining walls, or in any area where there may be a sudden change in elevation or a hazardous drop-off.

All safety railings shall:

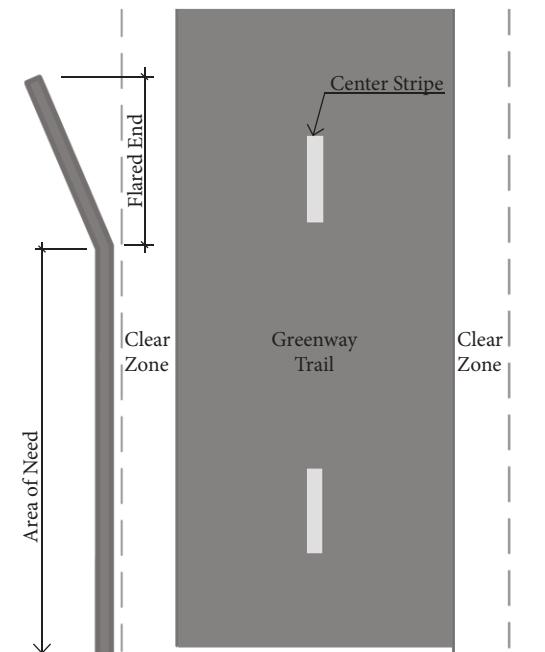
- include a smooth, wide “rub rail” for bicyclists handlebars between 33” and 36” above the surface
- at a minimum be installed at each instance where the horizontal distance between the edge of the path pavement and the top of the slope or hazard is less than 5 feet of separation
- begin prior to, and extend beyond the area of need to complete a safe transition
- be designed with ends that are flared away from the trail edge
- comply with all local, state, and federal regulations and building codes
- be marked with MUTCD object markers if the rail ends within the 2'-0" clear zone

DESIGN STANDARDS AT-A-GLANCE

Height.....	48" min.
Material.....	Tubular steel pipe, wood and wire mesh frame, or a combination thereof
Lateral Offset.....	2'-0" min. (may be reduced to 1'-0" if introduced with appropriate warning markings and flaring end treatments)
Horizontal Rail Spacing...	Below 27" - 6" sphere shall not pass through space between rails Above 27" - 8" sphere shall not pass through space between rails



ELEVATION VIEW



PLAN VIEW

Trailhead

Trailheads serve as formal points of access to the greenway network and may provide certain related public facilities such as parking, restrooms, drinking fountains, etc.

All trailheads shall:

- provide for safe and efficient circulation for motor vehicles, bicycles, and pedestrians
- provide an adequate number of parking spaces for the anticipated level of use
- provide clear directional and wayfinding signage
- be landscaped appropriately
- Trailhead parking surfaces should be constructed of porous concrete or pervious concrete pavers. If impervious, parking surfaces shall drain to low impact development (LID) stormwater facilities, such as rain gardens, enhanced swales, or similar water quality treatment devices. All other Gwinnett County stormwater management regulations apply

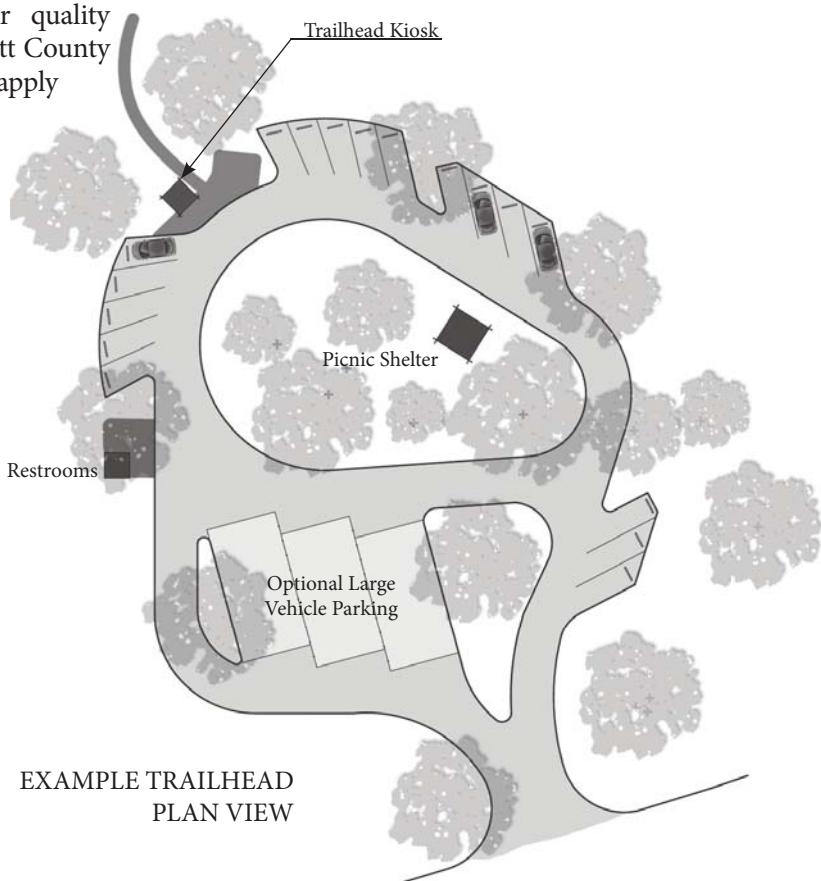
DESIGN STANDARDS AT-A-GLANCE

Minor Trailheads

- *Typically no parking*
- *Shall include Minor Trailhead Kiosk (pg 63)*
- *Typically includes drinking fountain*

Major Trailheads

- *Typically includes parking for 10 or more cars*
- *May include restrooms*
- *Typically includes drinking fountain*
- *Shall include Major Trailhead Kiosk (pg 62)*
- *Shall include security lighting (optional)*



At-Grade Intersections

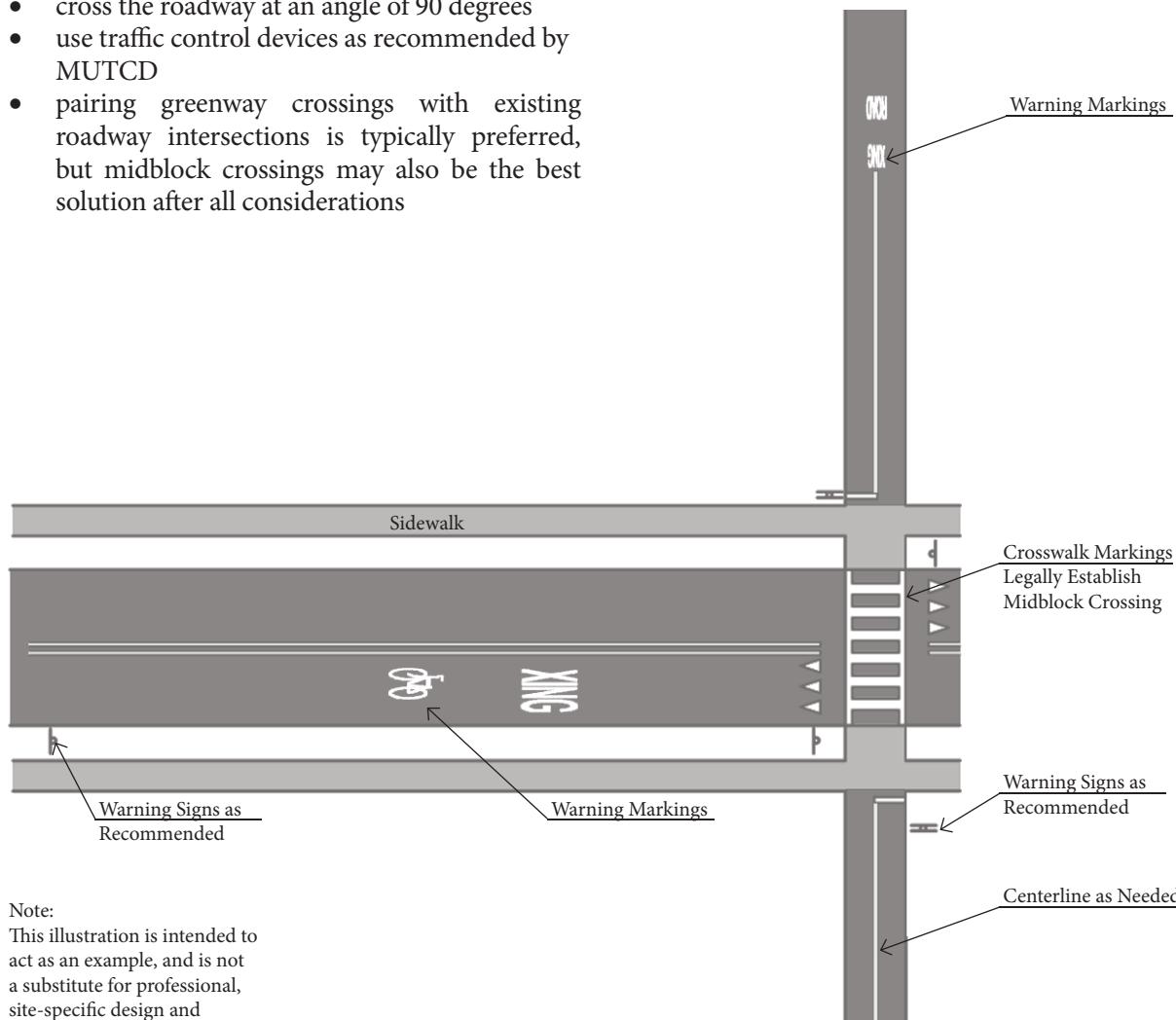
Intersections are important in making the trail system continuous. There are two types of at-grade intersections: midblock crossings, and at established roadway intersections.

All Intersections shall:

- be conspicuous to both road users and greenway users
- maintain sight lines appropriate for the requirements of the traffic control provided
- have approaches with relatively flat grades
- use bollards or other structures to limit vehicular access to the greenway
- cross the roadway at an angle of 90 degrees
- use traffic control devices as recommended by MUTCD
- pairing greenway crossings with existing roadway intersections is typically preferred, but midblock crossings may also be the best solution after all considerations

DESIGN STANDARDS AT-A-GLANCE

When designing intersections, “AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities” and the “Manual on Uniform Traffic Control Devices” should be consulted



Furniture

Site furnishings provide essential services for trail users, such as seating and bicycle parking. The style of the furnishings also establish trail users' impression of the greenway network.

All site furnishings shall:

- comply with existing product preference selections for Gwinnett County Parks Site Amenities

DESIGN STANDARDS AT-A-GLANCE

Should the Gwinnett County Parks Standards be revised in the future and result in discrepancies with this chapter, the Gwinnett County Park Standards should prevail for all design decisions.

		Manufacturer
Bench	 Model SWRB/G - 6PP	<i>Pilot Rock</i> <i>R.J. Thomas Manufacturing</i> <i>5648 Hwy 59 South</i> <i>Cherokee, IA 51012</i> <i>www.pilotrock.com</i> <i>or equivalent</i>
Drinking Fountain	 Model 440SM w/ jug filler option	<i>Most Dependable Fountains, Inc.</i> <i>5705 Commander Drive</i> <i>Arlington, TN 38002</i> <i>www.mostdependable.com</i> <i>or equivalent</i>
Pet Drinking Fountain	 Model 3800SM	<i>Most Dependable Fountains, Inc.</i> <i>5705 Commander Drive</i> <i>Arlington, TN 38002</i> <i>www.mostdependable.com</i> <i>or equivalent</i>
Litter Receptacle	 Model TRH-32 with CN/G-5732CL galvanized trash can	<i>Pilot Rock</i> <i>R.J. Thomas Manufacturing</i> <i>5648 Hwy 59 South</i> <i>Cherokee, IA 51012</i> <i>www.pilotrock.com</i> <i>or equivalent</i>
Bicycle Rack	 Model U/2	<i>Cycle-Safe</i> <i>4630 Ada Drive</i> <i>Grand Rapids, MI 49546</i> <i>www.cyclesafe.com</i> <i>or equivalent</i>



Fencing

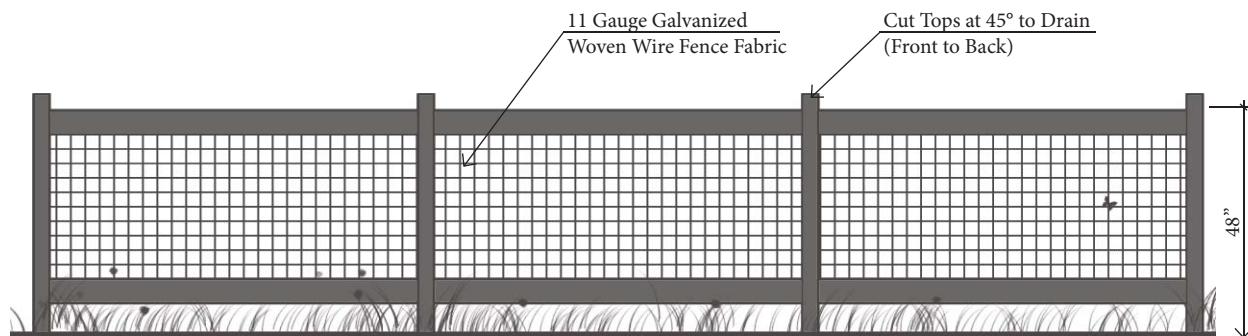
Fences are used to protect trail users from potential hazards or to keep trail users from straying onto private property.

All fencing shall:

- be used only when necessary
- consider the use of landscape plantings to soften the appearance of fences
- avoid the use of chainlink unless it must be used for specific reasons, e.g. secured facility adjacent, or equal replacement for relocated fence
- solid privacy fences shall not be installed unless greenway implementation causes the relocation or replacement of existing

DESIGN STANDARDS AT-A-GLANCE

<i>Height</i>	As needed, but typically 48"
<i>Material</i>	4 board wooden fence or wood and wire mesh combination (other styles may be used only when necessary or site appropriate)
<i>Lateral Offset</i>	2'-0" min.



WOOD AND WIRE MESH STYLE FENCE



FOUR BOARD WOODEN FENCE

Bicycle Stairway

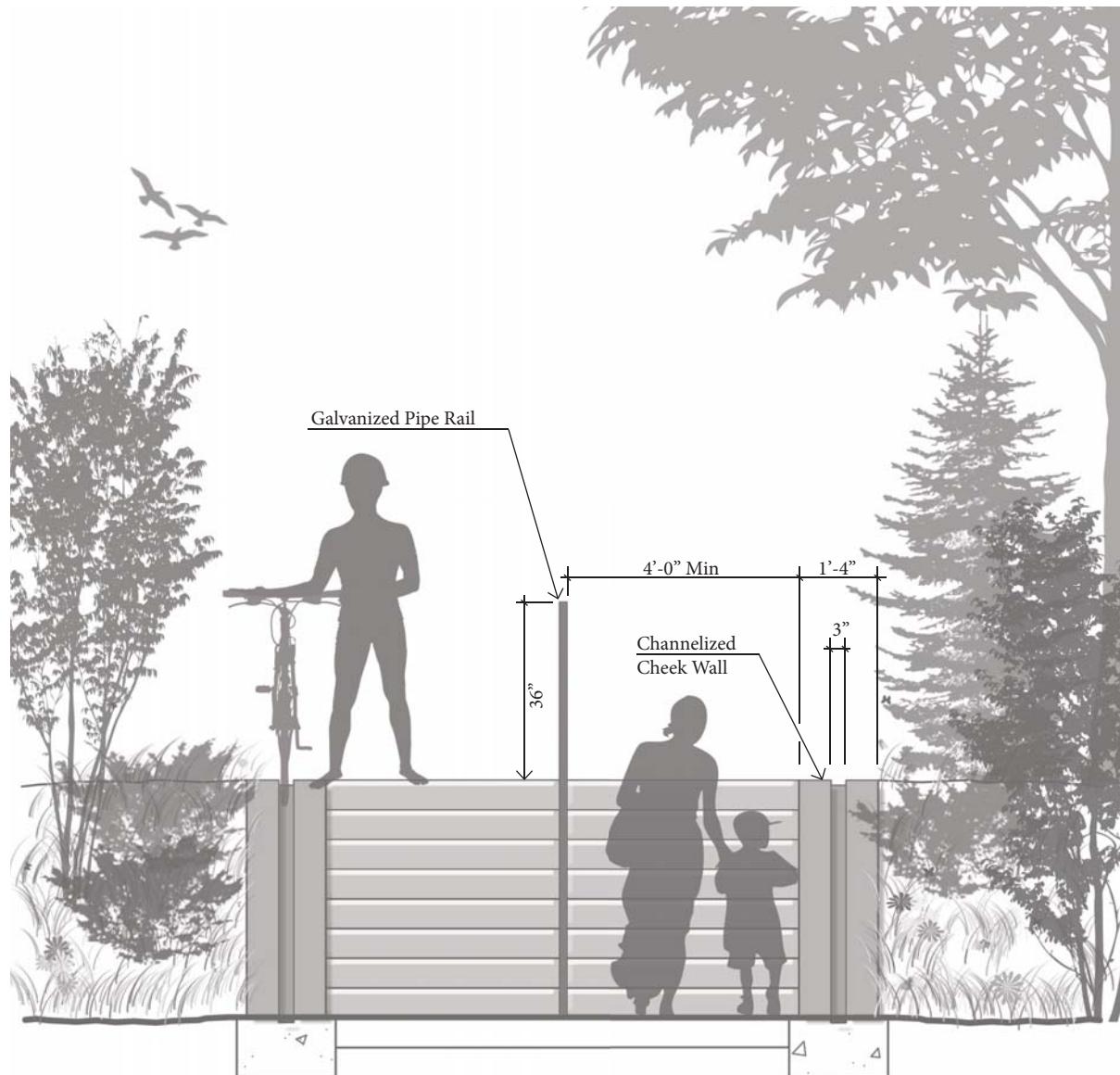
Bicycle stairways are standard pedestrian stairways that include a channelized cheekwall alongside it to facilitate walking a bicycle up or down the stairway.

All bicycle stairways shall:

- be used where stairs are the only option
- include a handrail in the center of the stair

DESIGN STANDARDS AT-A-GLANCE

Cheekwall Width.....	Typically 1'-4" with 3" channel in the center
Material.....	Stone or concrete with hand-rubbed finish on all exposed surfaces
Lateral Offset of Rail.....	4'-0" min.



ELEVATION VIEW OF BICYCLE STAIRWAY



G. Wayfinding Standards

A system of wayfinding signage is required throughout the Gwinnett County Greenway network to ensure that information is provided to trail users regarding the safe and appropriate use of greenway facilities. With consistent application of signage standards, the trails will be more user friendly, easier to navigate, and safer.

There are six types of signs in the Gwinnett County Greenway Network:

Kiosk: Major Trailhead
Kiosk: Minor Trailhead
Directional/Interpretive Sign
Regulatory Signs
Mile Marker Posts
Post and Symbols

These signs serve to identify Gwinnett County Greenway Trails, illustrate the types of activities allowed or disallowed on the trails, orient patrons within the system, provide visual directions, and regulate traffic on the trail.

Goals

- Reinforce an overall aesthetic image that incorporates the 'Gwinnett Greenways' logo and colors
- Provide clear wayfinding to residents and visitors
- Enhance accessibility

Colors

Most signs in this standards package are constructed from composite lumber material with color-core plastic panels. The color of the material itself will dictate, to a large degree, the colors of the signs. New signs should match, to the degree possible, the same colors of existing signs. Variation may be minimized by contracting with a single sign supplier. Existing signage colors are listed below for reference.

Sign Panel: King ColorCore 'Green/White/Green'
Sign Posts: Composite Lumber 'Cedar'

Logo

The 'Gwinnett Greenways' logo should appear as indicated on the signs. This item is NOT to be generated, and can only be supplied by Gwinnett County upon request.

Font

Consistent use of font is another important aspect to consider when developing a consistent look. For the Gwinnett County Greenway Network, it is recommended that all typography be executed in the Helvetica font for its legibility and universal availability.

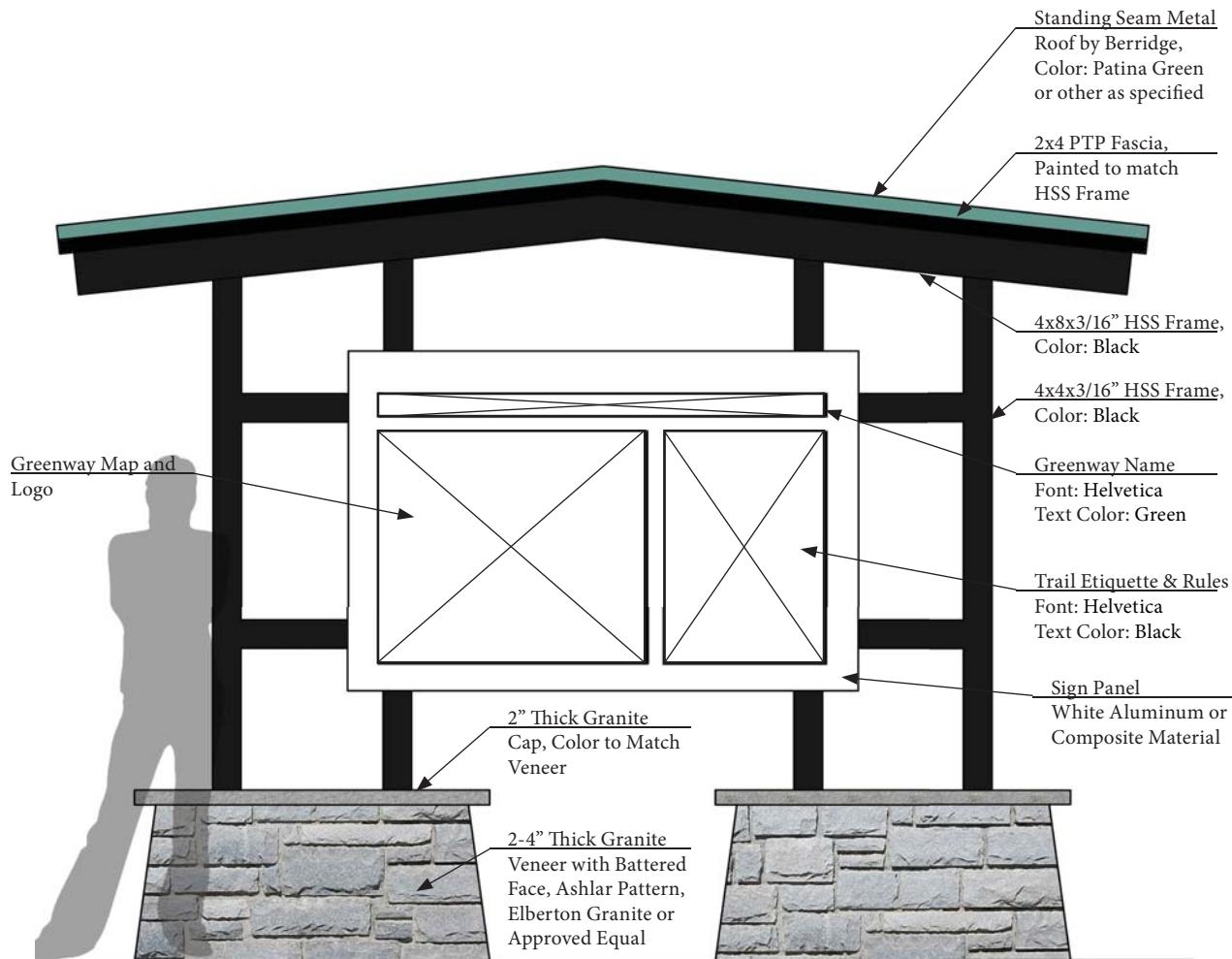
Kiosk: Major Trailhead

These large informational panels welcome the user in a number of ways. The large panel identifies the name of the trail, provides a trail map that locates the user, and illustrates the activities that are allowed or disallowed on the trail.

This style of sign should be located only at major trailheads and where access to the trail overlaps with an existing park or other major public amenity.

DESIGN STANDARDS AT-A-GLANCE

Height.....	10'-6" from finished grade to apex of roof
Width.....	9'-2" from outer edges of HSS beams
Roof Slope.....	3:1
Frame Material.....	Hollow structural section steel, painted black in color
Foundation Material.....	CMU structure with Elberton granite veneer in ashlar pattern





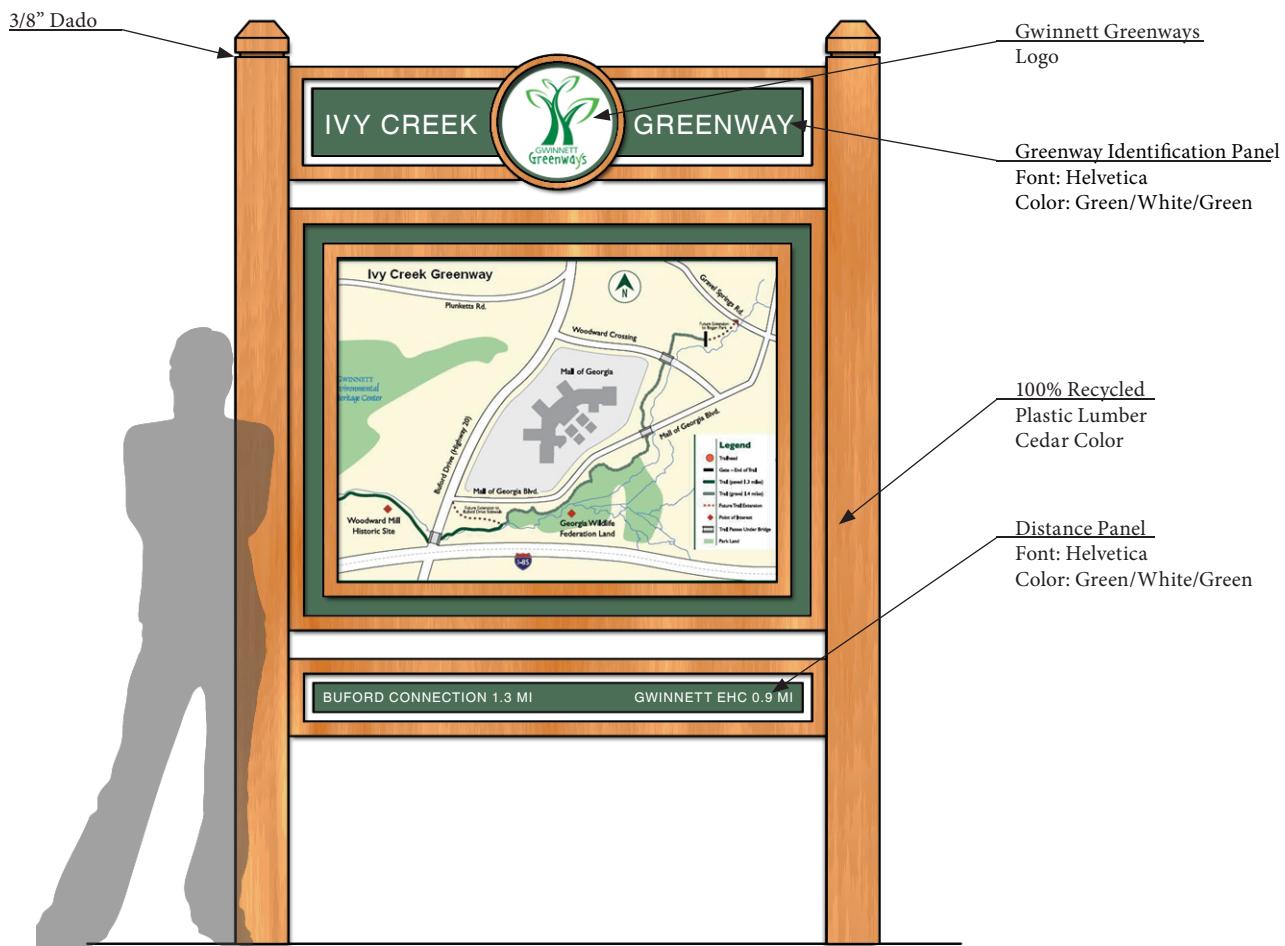
Kiosk: Minor Trailhead

These double-sided large informational panels welcome the user to the Gwinnett Greenway Network. One side of the main panel identifies the name of the trail and provides a trail map that locates the user. The opposite side illustrates trail rules, etiquette, and other guidelines. Below the large informational panel is a smaller panel that gives distances to nearby locations.

This style of sign should be located at minor trailheads where access to the trail is derived primarily from neighborhood pedestrian or bicycle access.

DESIGN STANDARDS AT-A-GLANCE

Height.....	8'-0" from bottom to top of posts
Width.....	5'-8" from outer edges of posts
Font.....	Helvetica
Material.....	Recycled plastic lumber, Cedar in color
Panel Color.....	Green/White/Green



Directional/Interpretive Sign

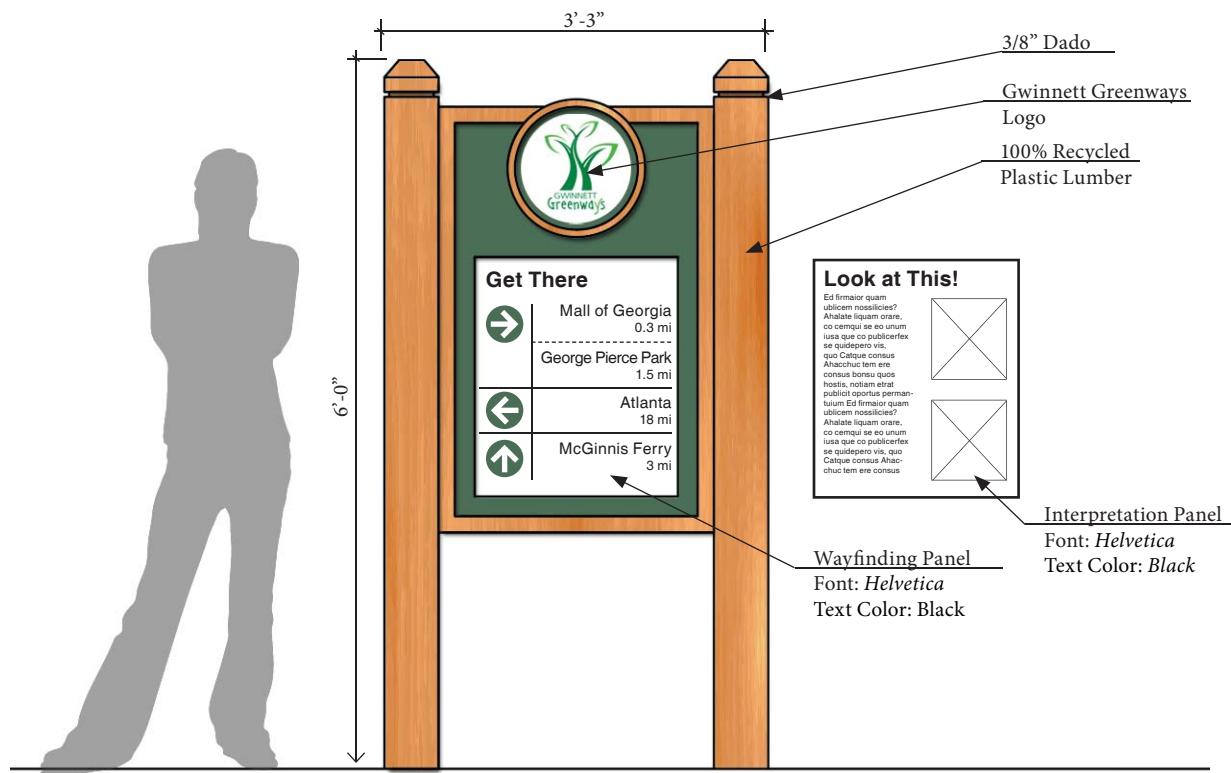
This sign style provides a framework for sign panels that either direct pedestrians to areas of interest along the greenway, or that interpret natural or cultural features along the greenway.

For directional sign panels, the arrow should rotate in 45 degree increments in order to retain consistency.

These signs should typically be placed perpendicular to path centerline and should *always* appear at intersections where a greenway spur joins a primary greenway.

DESIGN STANDARDS AT-A-GLANCE

Height.....	6'-0" from bottom to top of posts
Width.....	3'-3" from outer edges of posts
Font.....	<i>Helvetica</i>
Material.....	Recycled plastic lumber Cedar in color
Panel Color.....	Green/White/Green



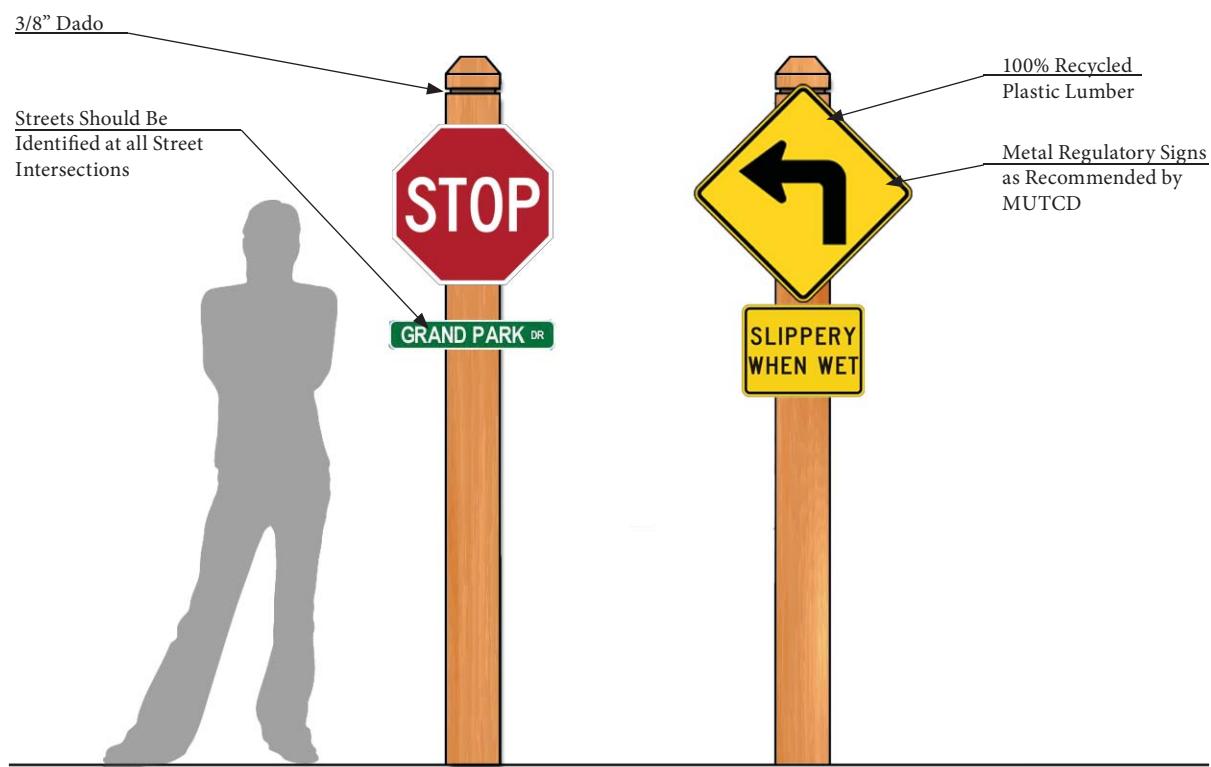
Regulatory Signs

These sign posts hold regulatory and warning signage as recommended by AASHTO and MUTCD. These signs are critical for the health, safety, and welfare of trail users. They may be double or single-sided.

These signs should be placed perpendicular to the trail centerline and should be sized appropriately for bicycle facilities as specified in the Manual on Uniform Traffic Control Devices (MUTCD).

DESIGN STANDARDS AT-A-GLANCE

Height.....	<i>Mounting height shall be a minimum of 4' and a maximum of 5' measured from the bottom edge of the sign to the near edge of the greenway surface posts</i>
Width.....	<i>Single post - width dependent on sign panel width. Typically 18", but shall comply with MUTCD guidelines for Bicycle Facilities</i>
Material.....	<i>Recycled plastic lumber, Cedar in color</i>



Mile Marker Post

Mile marker posts are distance markers placed every one-half mile.

These posts let trail users know where they are in case of emergency, as well as provide information to those who may be tracking their exercise mileage.

The Gwinnett County Help Locator panel should be installed on each mile marker post.

The mileage number should be milled & painted on both faces of the post perpendicular to the trail centerline. The help locator should be attached to the face of the post parallel to the trail centerline.

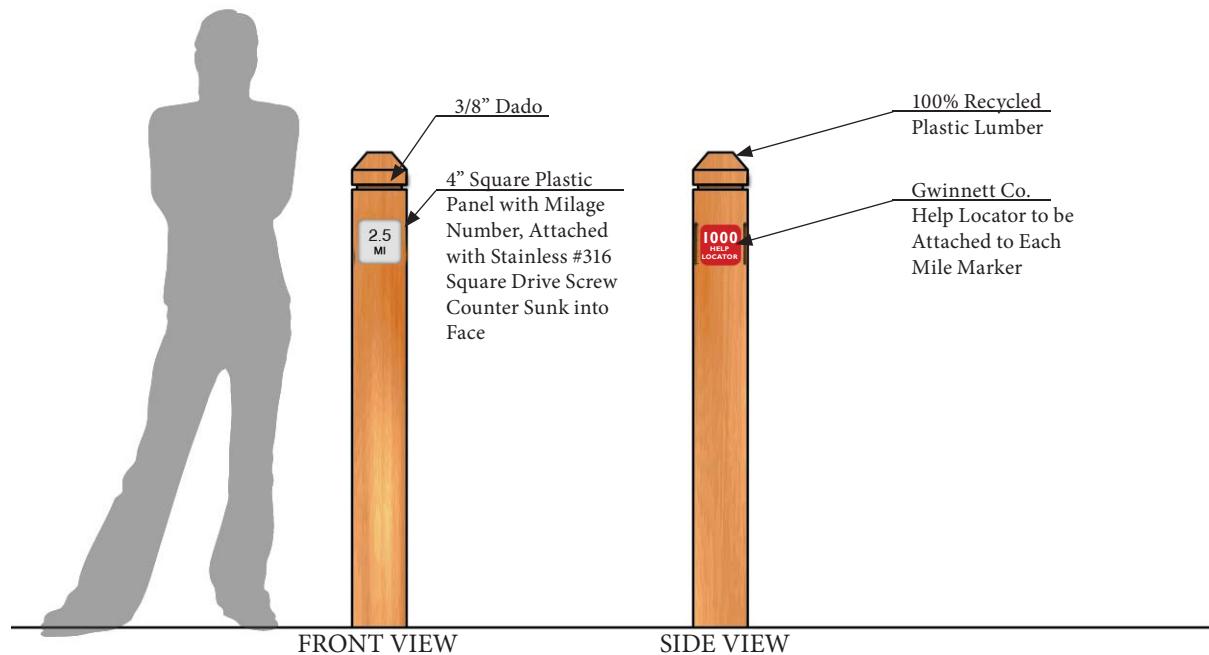
DESIGN STANDARDS AT-A-GLANCE

Height.....4'-0" from bottom to top of posts

Width.....Single post

Font.....Helvetica narrow

Material.....6 x 6 Recycled plastic lumber, Cedar in color



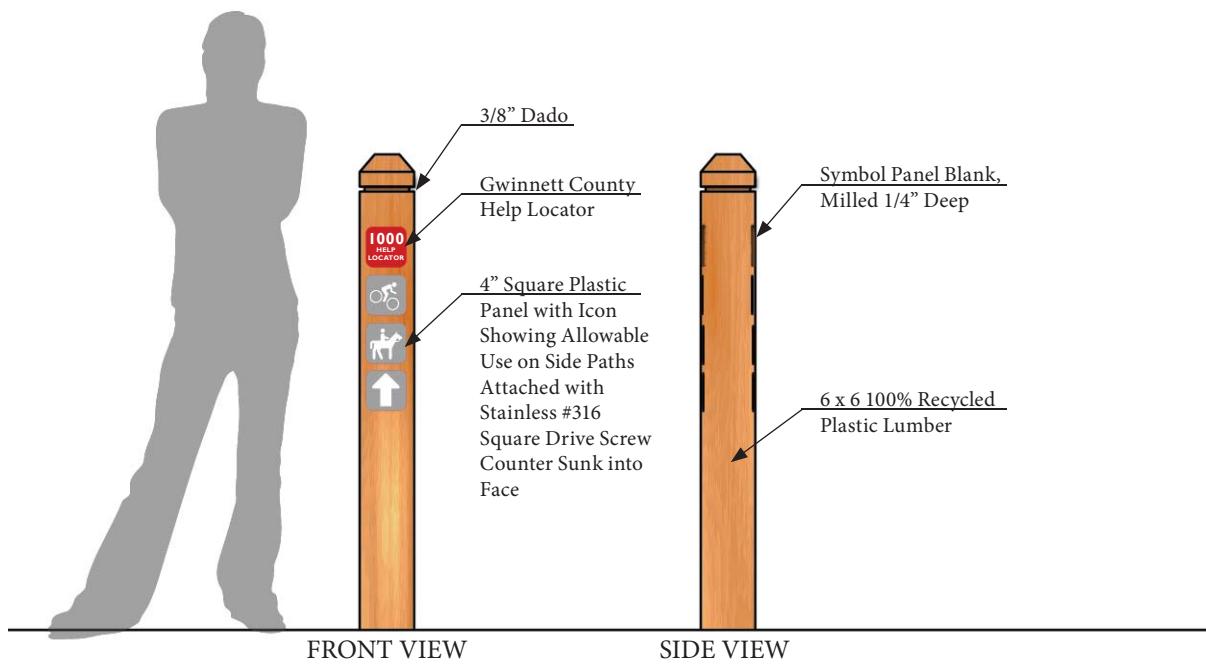


Post & Symbols

These sign posts should be used at the entrance to side trails that may intersect with greenways. Side trails may be mountain biking, hiking, or equestrian trails & the posts shall be symbolized to show proper uses.

DESIGN STANDARDS AT-A-GLANCE

*Height.....4'-0" from bottom to top of posts
Width.....Single post
Material.....Recycled plastic lumber, Cedar in color*



Warning Bollard

These sign posts should be used to warn greenway users of fixed objects adjacent to the shared-use paths, or to give trail users warning when they are approaching a hazard or intersection.

DESIGN STANDARDS AT-A-GLANCE

Height.....3'-0" from bottom to top of posts
Width.....Single post
Material.....Recycled plastic lumber, Cedar in color

